# UNITED ARAB REPUBLIC

# SOUTHERN REGION

*******

CENTRAL MINISTRY OF INDUSTRY

*******

Egypt - Ministry of Industry

# SECOND FIVE YEAR INDUSTRIAL PLAN

* * * *

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# 1. PETROLEUM INDUSTRIES

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## 1. PETROLEUM INDUSTRY

### I. EXPLORATION WORK FOR OIL:

1. Goophysical Prospecting
    - A) Gravity, magnetic and land seismie
    - B) Marine Seismie
    - C) Acquisition and operation of Five Drilling Rigs

### II. DEVELOPMENT OF THREE OIL FIELDS:

### III. REFINING & PETRO CHEMICALS:

1. Petro Chemical Industries
2. Petroleum Solvents
3. Blown Bitumen
4. Gas Recovery of Oil Fields
    - A) From Ras Ghareb, Bakr and Karim Oil Fields
    - B) From Bulaim and Abou Redies Oil Fields

### IV. STORAGE TANKS:

1. Storage Tanks in Suez
2. Storage Tanks for Petroleum Products in the Provinces.

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## I. Exploration Work For Oil

### Geophysical Prospecting Work

The object of the project is to promote the discovery of oil prospective areas in the Southern region of the U.A.R. In order to achieve the above object it is decided to employ the following geophysical methods :-

A. Gravity, magnitic and land seismic for intensive exploration work of the Egyptian deserts.

B. Marine Seismic to explore the off shore areas in the Mediterranean Sea from Gaza to Saloum and in the Gulf of Suez.

C. Acquisition and operation of Five Drilling Rigs

Purpose of the Project :
As a result of Geophysical & Seismic work, it has been decided to acquire five extra drilling units for drilling exploratory wells in the different areas already Surveyed.

The rigs required will be as follows

1) Two marine drilling units mounted on barges complete with their operating accessories. Capacity of such rigs will be between 3000 & 5000 metres.
2) One drilling rigs for drilling up to 3000 ms
3) Two drilling rigs for drilling from 1000 to 1500 metres wells.

## II. Development of Three Oil Fields

Purpose of the Project : If aims at developing the three oil fields that will be explorated in the Second Five Year Plan in order to produce 1,800,000 tons of crude oil in the fourth year and 2400,000 tons in the Fifth year of the program. The production will reach its maximum capacity during the Five Years following the second Five Year Plan. The average product from the three fields is about 4,500,000 tons a year for 10 years.

The estimated value of this product is 15,750,000 £ a year with an annual profit of 11,250,000 £ divided as follows :

1) The estimated age of the oil field is ten years in which it produces about 1,500,000 tons yearly.
2) The ton's price is 3,500 £ i.e. 1.40 $ a barrel on the basis that a ton is 6.8 barrels.
3) Running expeditures of the field amounts to 1,500,000 £ including price of equipment, consumption, capital interest and the running expeditures.
The value of the annual product = 4,500,000 x 3,500 £ = 15,750,000 £

## III. Refining & Petro Chemicals

### 1) Petro chemical Industries :

Purpose of the project : The estimated amount of excess Benzine resulting from the pelioleum projects in the First Five Year Plan amounts to 400,000 tons. It should be well disposed of for the improvement of the economic value of These projects and running them at their full capacity.

100,000 tons of this quantity is light gasoline that is not used now except as a fuel. This gasoline is an important element in the industrialization of unsaturated gases - used as raw materials for manufacturing of Petrochemicals. This excess light gasoline should be industrialized with the object of exporting its products. The General Petroleum authority entrusted one of the American Petroleum companies specialized in the industry of petrochemicals to study the project from both the technical and economic aspects. The company will present its report in four months. The productive capacity of the project is 100,000 tons a year of light gasoline which is the excess crude gasoline resulting from the First Five Year Plan projects.

The feeds tock used in this project is 100,000 tons of light gasoline whose value is One Million £. The value of the intermediate products used as raw materials for the petrochemical industries can be estimated as follows :

| | Tons | | L.E. | | L.E. |
|---|---|---|---|---|---|
| Hydrogen | 860 | x | 29 | = | 24940 |
| Methane | 14600 | x | 8 | = | 116800 |
| Ethane | 3650 | x | 8 | = | 29200 |
| Acetylene | 340 | x | 8 | = | 2720 |
| Ethylene | 22640 | x | 8 | = | 181120 |
| Propylene | 13600 | x | 8 | = | 108800 |
| Propane | 580 | x | 8 | = | 4640 |
| Butylene | 5630 | x | 8 | = | 45040 |
| Butadiene | 4690 | x | 4.5 | = | 21105 |
| Butane | 290 | x | 6 | = | 1740 |
| High Octane Gasoline | 33900 | x | 12 | = | 406800 |
| | | | Total | | 942905 |

By using these Saturated and unsaturated hydrocarbon gases produced by Steam pyrolysis, the overall estimated amounts & value for the Suggested Petrochemicals will be as follows :

| Product | Output, Tons/annum | £/Ton | Total Value £ |
|---|---|---|---|
| Nitro-chalk | 200,000 | 20 | 4,000,000 |
| Polyvinyl Chloride | 5,000 | 250 | 1,250,000 |
| Ethyl alcohol | 28,000 | 42 | 1,176,000 |
| Dodecylbenzene | 3,000 | 100 | 300,000 |
| Glycerine | 17,400 | 240 | 4,176,000 |
| Synthetic Rubber | 10,000 | 180 | 1,800,000 |
| Polystyrene | 3,000 | 250 | 750,000 |
| High Octane N. Gasoline | 33,100 | 12 | 406,800 |
| | | | 13,858,800 |
| By products | | | |
| Hydrochloric acid | 10,660 | 10 | 106,600 |
| Calcuim Chloride | 7,363 | 10 | 73,630 |
| | | | 14,039,030 |

2) Petroleum Solvents

The progress of industrialization in U.A.R., the development of many new industries dependent an petroleum solvnets such as polish industries, and the expansion of existing present industries necessitated the increase of the import of pertroleum solvents by hard currency : Thus, it was decided to install this new industry to meet the demands of the local market. The scond Five year Plan included the installation of two exactly similar units : one at Suez, the other at Alexandria.

Purpose of the Project : It aims at the production of petroleum solvents for local consumption and the utilization of a part of the excess gasoline.

The productive capacity of a single unit is around 6000 tons a year liable to increase to 15,000 tons. The value of the product on the basis of 6000 tons a year would be 300,000 £.

3) Blown Bitumen

Purpose of the Project : It aims at producing blown between for local consumption. The productive capacity for the project is 2500 tons a year, That is in conformity with local consumption which is estimated by 1000 tons expected to reach in 1960 1600 tons.

The estimated product of the project is 2500 tons a year at 77500 £ if the price of the ton is 31 £.

4) Gas Recovery of Oil Fields

Purpose of the Project : It aims at the export of excess gas produced by the oil fields instead of burning it :

A. Project for the recovery of Propane and Butane from oi fields at Ras Gharib, Bakr, and Karim :

The above mentioned fields produce around 70,000 metric tons of gas every year containing about 26,000 tons of propane and bulane of which 75,000 can be recovered and bottled for domestic and industrial use. All the liquid propane, and butane produced will be exported being an excess of local consumption. Besides, the transfer of these quantities from the fields to the places of consumption and the domestic use of propane liquid will create some technical problems that will harm the economic value of the project. After the consideration of these aspects and the study of the possibilities of export : markets, prices ........ it was decided that the whole product. be exported.

B. Project for gas recovery of Balaim and Abourdeim oil fields :

The mentioned oil fields produce 115 metric tons gasolin every year containing about 40,000 tons of propane and butane of which 750,000 could be recovered and filled for domestic and industrial utilization abroad.

## IV - Storage Tanks

A. Storage Tanks in Suez

Purpose of the Project : Due to the expansion in the Suez Refinary, the storage capacity for crude petroleum should be increased by 75,000 tons.

B. Storage Tanks for Petroleum Products in the Provinces.

Purpose of the Project : It aims of the increase of the storage capacity to meet the local petroleum consumption during four months in areas far from the producing centres, and during two months in areas near the refining unitts.

The required storage capacity for solar is 10,000 tons and for mazout is 20,000 tons distributed in 11 districts.

## 2. MINING INDUSTRIES

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# 2 - MINING INDUSTRIES

## I. Mineral Exploitation Projects.

### A) Iron Ores

1) Increase of Production at Asswan Iron Ore Mines.
2) Project for Concentration of Asswan Iron Ores.
3) Exploitation of the Eastern Desert Iron Ores.

### B) Phosphate Ores

4) Project for Phosphate Exploitation from Areas Near the Nile Valley.
5) Project for Phosphate Exploitation from Hamrawein .
6) Increase of Production of Rock Phosphate at Safaga Mines.
7) Increase in the Production of Rock Phosphate at Kosseir Mines.

### C) Black Sands

8. Project for the Exploitation of Black Sands.
9. Project for the Production of Rare Earths.

### D) Copper Ores

10. Exploiting of Copper Ore in Om Samiuki

### E) Manganese Ores

11. Project for the Manufacturing of Ferro-Manganese

### F) Coal

12. Project for exploiting Coal in Oyoun Moussa
13. Exploitation of Coal in Thora & Bedaa

### G) Different Other Ores

14. Project for Exploiting Talc, Barytes, Muscovite, Sulphur, Vermiculite & Asbestos

15. Expansion in the Production of Selica Sands for Glass Industry.

16. Refining of Salt & Increase of its Production
17. Increase of Gold Milling
18. Increase of the Production of Marbles & Ornamental Stones.
19. Production of Iron Oxides for Pigments
20. Increase of Production of Basalt
21. Production of Graphite
22. Project for Ilmenite Concentration

### H) Lead & Zince Ores

23. Exploitation of Um Gheig Lead & Zink Ores
24. Concentration Plant for Lead Ores at Um Gheig & Zog El Bahar.

## II. Mineral Prospecting Projects:

1. Coal Prospection
2. Prospection for Copper Ores
3. Prospection of Iron Ores
4. Prospecting Work for Lead & Zinc Ores
5. Prospection for the Rock Phosphate Deposits
6. Prospecting Project for Sulphar Deposits
7. Project for Prospecting the Pegmatite Rock containing Feldspar, Beryl & Mica.
8. Project for Prospecting Work for Molebdenite
9. Project for Prospecting Work for the Diatomacious Earth.
10. Project for the Prospecting of Manganese Ores
11. Project of Dressing Investigations of Chromite Deposits.
12. Project for Investigations of Aluminium Production.

# I- Mineral Exploitation Projects

## A. Iron Ores.

### 1. Increase of Production at Asswan Iron Ore Mines

**Aim of Project:**

The average yearly production of Asswan Iron Ore Mines amounts to about 250,000 tons. This project aims to equip the mines with new machinery develop new areas and increase the production to 550,000 tons of iron ore per year which will be sufficient for the iron & steel industry at its present scale. Also 550,000 tons/year is thought to be the maximum capacity of Asswan mines based on data of up till present investigations. The equipment of Asswan mines is enough for the production of 400,000 tons/year and there fore machinery and equipment enough to mine, transport ... etc of 150,000 ton of iron ore/year will be dealt with during the second industrial plan.

### 2. Project for Concentration of Asswan Iron Ore;

**Aim of Project:**

The capacity of Asswan iron mines will be about 550,000 t/year during the 2nd industrial plan. This ore contains 42% $F_e$ and it is planned to concentrate it to 49% $F_e$ By upgrading the ore to this extent there will a considerable saving in the coke consumption as well as in the cost of transportation from Asswan to Helwan because the concentration plant will be errected at Asswan.

During the 1st industrial plan representative samples were collected from the mines for dressing tests. These tests & investigations are carried out in the U.S.S.R. according to the Agreement of Technical & Economical cooperation. Also the Soviet concerns are engaged in the projecting and designing of the concentration plant of a capacity about 550,000 tons per year. It is expected that the investigations for dressing the iron ore and the projecting work will be completed during the 2nd industrial plan which necessitates the execution of such project.

## Exploitation of the Eastern Desert Iron Ores

### Aim of Project:

During the 1st industrial plan the exploration work was carried out on the iron ore deposits at Wadi El Karim, Um Khamis, Um Nar & Um **Groffaat** some 600 Kms south of Suez near the red Sea Coast. It has been contracted with Fried Krupp to carry out all the prospecting work, mining studies, ore dressing and metallurgical treatment as well as all problems connected with the exploitation of these deposits. All designe work of the mines, transport works ...etc is also included in the contract concluded with Krupp. It is expected that this work will be completed by 1963 then the executing project to produce about $\frac{3}{4}$ million ton/year will be executed.

This capacity is enough for the local industry after its expansion during the 2nd industrial plan.

## B. Phosphate Ores

### Aim of the Project :

Phosphate is considered one of the country's most important minerals, (The exportation of phosphate is estimated at L.E. 1,000,000 per year in foreign currency)

It also supply the super phosphate plants with raw materials for the production of fertilizers.

Phosphate mines are to be found on the Red sea coast, in Koseir and Safaga. The average production is estimated at 400,000 tons per year, This output is exported to Japan, Ceylon, Colombo and other countries of the far east, which are considered a customary market as regards Egyptian Phosphate. The demand from these countries has increased tremendously in the last few years. Which has led to the necessity of increasing the production from the present mines at Koseir and Safaga and also to consider opening of new mines in the area of Hamrawein on the Red sea coast, in order to be able to fulfill the needs of the Far East markets, which is most essential for us to keep, so that we can benifit by the foreign currency for our national economy.

Phosphate is also to be found in great quantites in the Nile valley between Edfu and Esna - Production of which is estimated at 150,000 tons per year - most of which is consumed in the factories of super phosphate at Abu Zabaal and Kafr el Zayat. The increase in the area of the cultivated land demands the increase in the production of supper phosphate, & also there is an increased demand on phosphate fertilizer owing to the will to arrive to the economical quantity of fertilizer adde to the land.

Egyptian phosphate has in the last few years been in demand on the European market, which led to the exportation of phosphate from the Nile valley via Alexandria to Spain, Yugoslavia, and Chechoslovakia, inspite of competition from Jordan & North Africa.

As great quantities of phosphate is greatly in demand by the local market for the manufacturing of fertilizers necessary for cultivating agricultural land and because of the greater demands of the European market for Egyptian phosphate. All this has led to the following projects in order that they should be executed and included in the Second Industrial Plan.

(1) Phosphate project Nile Valley.

(2) Phosphate project Hamrawein.

(3) Increase production of rock Phosphate at Safaga Mines.

(4) Expansion in production of rock Phosphate at Koseir.

Project for Phosphate Exploitation from areas near the Nile Valley

Aim of the project:

This project aims to the exploitation of phosphate areas between Edfu and Esna, to provide the raw materials for the fertilizing plants at Abu Zaabal and Kafr el Zayat as well as to export the rock phosphate from Alexandria Port to the European markets.

The requirements of phosphate in the Southern Region of the U.A.R. in the near futur will reach 300,000 tons of phosphate ore per year. This is due to the increase of cultivated land after the High Dam project and the New Valley project.

Regarding the European market demands for Egyptian phosphate from Spain, Rumania, Yugoslavia, Chechoslovakia, Italy reached approx. half a million tons in 1960.

Although the European market is not considered a customary market for Egyptian Phosphate which makes it advisable to limit the production of all phosphate for this market during the first few years until this is established as a customary one, especially as International circumstances eargerly demand for Egyptian phosphate disregarding phosphate coming from Jordan, Morocco, Tunis and Israel.

The productive capacity for exploiting phosphate in the Nile valley is within the limits of 600,000 to 700,000 ton per year 300,000 for the local market, the rest for exportation, with the assumption of increasing the production in future, whenever needed.

The first Industrial plan took this project into consideration necessary preliminary studios were made for designing the project. Samples of phosphate were sent to the Soviet Union to carry out researches, concentration tests to define the best methods for dressing & concentration.

These studies are expected to be executed in 1960. Detailed studies and preparations in the mines are being made for producing phosphate from the Nile Valley. This will lead to the production of small quantities which could be sold in the local market or exported. In this way the project would benefit by getting to know the foreign market, by the time Egyptian phosphate takes its place in these markets.

Project for Phosphate Exploitation from Hamrawein

Aim of the Project:

Demands for Egyptian phosphate having increased in the far East market, gave grounds for planning to increase the production and exporting it to that area.

Owing to the fact that phosphate area on the Red Sea Coast do not allow for large expansion or fulfil the demands of the Far East market, therefore, it has been decided to exploit new mines in the area of HAMRAWEIN on the Red Sea Coast, situated between Koseir and Safaga, with the assumption that the output of these mines would be 200,000 tons a year, to be increased in the future according to the demands of the market, or according to the deficiency in the production of phosphate from Koseir and Safaga, mines which have been working for over 30 years.

The First Industrial Programme took into consideration the working of HAMRAWEIN area. The Ministry of Industry made the preliminary studies to define phosphate areas and to make the necessary geological survey.

Samples of phosphate from Hamrawein area were sent to the Soviet Union for investigations necessary for its dressing to exclude all impurities mingled in it, and for its concentration.

Studies concerning researches and experiments are expected to be finished during the second Industrial programme i.e. before 1962. This led to arranging the Executive programme for exploiting phosphate mines - Hamrawein area, its productive capacity 200,000 tons per year, to be exported to the Far East.

6, **Increase in production of Rock Phosphate at Safaga Mines.**

Aim of project :

Safaga phosphate mines produces about 100,000 tons of rock phosphate / year. Most of this rock phosphate is ground & exported to the Far East under the name of Safos. This phosphate is demanded in some countries as Ceylon, Colombo and other for agricultural purposes as fertilizer to the land. Demands have been increased considerably in the last years for this phosphate which gave the idea of executing a project to double the capacity of Safaga Mines to 200,000 tons/year From this production it is planned to grind about 40% & the rest to exported as rock phosphate,

7. Increase in the Production of Rock phosphate at Kossier Mines

Aims of project :

The annual production of Kossier phosphate mines is approximately 300,000 tons, for export to the Far East. Demands on the Egyptian phosphate necessitates to increase the production to about 400,000 tons/year. The project includes new equipment, machinary as well as developing new mines to meet the increase of the production by 100,000 tons of phosphate/ year.

C. Black Sands.

8. Project for the Exploitation of Black Sands.

Aim of project

Black sand deposits occur on the Medetereanian Sea near Rossetta & Damietta.

During the 1st industrial plans all investigations for the dressing, separation and concentration of the valuable constituents in the black sands have been completed. It is planned to errect a new plant for the seperations of black Sands of a capacity enough to treat 30,000 tons/year during the 2nd industrial plan. This will produce magnetite, ilmenite, zircon, rutile & monasites mainly for export.

## Project for Production of Rare Earths

### Aim of project

The production of monazite will be about 500 tons/year during the 2nd industrial plan fromthe Black sands factories. It is aimed to errect a plant to treat this monazite in order to produce Uranium & thorium salts of nuclear purity, cerium coke, etc.....

## Copper Ores

### Exploiting Copper Ore in Om Samuiki

### Aims of the Project

Om Samiuki lies about 100 km. from the Abou Ghosoun harbour on the Red Sea Rich ores.are found, containing 3% copper, 25% Zince, Gold and Silver in small quantities.

During the first industrial plan these ores were studied from the geological and metallurgical points of view, with the help of experts from Tchecoslovakia. An agreement was made to estimate the quantities of the ore, its location, its contents, method of extraction its concentration for extraction of the metals from the ore and finally to make the plans for the mines and the factories if the studies and researches prove that the ore can be exploited economically. Investigations proved that the ore extends in large areas but the quantities of the ore are not yet estimated, although it is a promising deposit. The Tchecoslovakia experts started working in February 1959, the agreement was concluded in may 1959, and it is expected that their studies will be finished within 1961, and then a project for the exploitation of this area will start during the second industrial plan if the investigations prove that the project is economic.

It is expected that the annual production will be approximately 250,000 tons of ore to produce 20,000 tons of copper concentrate, and 80,000 tons of zinc concentrate which will produce about 5,000 tons of Copper and 40,000 tons of Zinc. The produced Copper will meet with the Local consumption for the different industrial purposes, as for the Zinc it will be in excess and can be exported.

## nganese Ores :

### oject for Manufacturing Ferro - Manganese:

### m of the Project:

The Manganese deposits in the Abou Zeneima area in Sinai is nsidered one of the principal ores in the country as the country exported re than 200,000 tons per year of it to England and the U.S.A. until 1956 en these countries stopped buying Egyptian Manganese and thus affected eatly the exports. The world market asked only for high grade Manganese ich is not produced in large quantities. It was then thought to dustrialize the low-grade Manganese, which represents the greatest part of yptian deposits, in order to make use of its products, namely Pig Iron and rro Manganese to Satisfy the local demands and to export the surplus of rro Manganese, because Ferro Manganese can be marketed more easily than e low-grade Manganese in the world market.

The local market needs 10,000 tons per year of Ferro Manganese. As r the pig Iron the market can use all the quantities that can be produced om the Ferro Manganese industry. It was, therefore, thought of to build e project in the smallest economic unit that is a volume of 100,000 tons r year of Manganese ore (22%) and manufacture it into 20,000 tons of rro Manganese (75%) and 40,000 tons of Pig Iron, besides 60,000 tons of w grade Manganese ore can be exploited and launched on the market.

This industry depends economically on the price of electricity used, ich represents the greatest part of the cost of production. This was the ason why great attention was given to the study of the sources of ectricity that can be found near the mines of Manganese in Sinai. It was ought to study the possibility of using the gases coming out of the Oil elds in Abou Redeis for producing cheap electricity instead of wasting ese gases, especially that it is only 18 km. from the port of Abou neima which is used for shipping Manganese. There is another reason r making this industry that is the discovery of another source of ectricity in the same area where coal was found. If after its oduction it is thought of to expand the industry of Ferro Manganese or to make new industries in the area coal can be used for generating power. The methods for the concentration of Managenese were previously studied and samples were sent to the Soviet Union. Studies were also made on the methods of industrialization of Egyptian Manganese ore to produce Ferro Manganese and Pig Iron by Krupp and the Demag Companies in Germany. Methods for concentration and dressing were also studied and it was proved that the industry can grow if a cheap source of electricity is available. An agreement with the Demag Co. was concluded through the aid of technical Assistance from Western Germany, for the study of Manganese ore in Sinai and for investigating the best methods for extraction, concentration and industrialization into Ferro Manganese and Pig Iron, and also to study the means of transport of the ore, the sources of electrical supply necessary and the marketing of the products. These studies are supposed to be completed by November 1960 which means that the Ferro Manganese project can be excuted in the Second industrial plan if the studies are successful.

### ) **Coal**

12. Project for exploiting Coal in Oyoun Moussa

Aims of the Project :

A 120 cms Coal seam is discovered in Oyoun Maussa in Sinai, 15 km. from Suez at a depth of about 500 meters below surface.

The first industrial plan gave its attention to investigate the area - work is still going on to determine the quantities of coal, its grade methods of mining and dressing. In case the investigations are successful the executive project will start in 1961 during the Second industrial Plan with a capacity of 300,000 tons per year approximately.

The optimum capacity will however be determinated after the evaluation of the quantities of coal, output of the mine , costs of Production and the economics of the project are completed.

## 3. Exploitation of Coal in thora & Bedaa

### Aims of the Project :

Coal is discovered in thora & Bedaa about 45 kms. from the port of Abou Zenaima in Sinai, over an area of about 60 square kms. with a thickness of 80 cm. During the first industrial plan investigations were made in the area and the geological work proved the possibility of finding coal in an area of 60 sq. km. Drilling is going on to prove the presence of coal in the area and to determine the depth of the coal seam as in some places it autcrops , dipping about 3 to 4°.

Specimens of this coal were sent to the Soviet Union during the first industrial plan where it was subject to laboratory investigations according the Technical & Economic Agreement.

These investigations proved that this kind of coal is valuable and can be used in several chemical industries as well as for generating electrical power and heat and is economically exploited in many countries. The exploration is supposed to be completed within 1961 and therefore it will call for the executing of the project in area if it were proved that the deposits could be exploited economically.

It is of importance to mention that this kind of coal is needed in many of the industries that will be built in the near future and which needs much coal, such as Ferro Manganese, Zinc, Lead, and the exploitation of Iron ores in Wadi Karim. The mines of Manganese in Abou Zunaima and the industry of Ferro Manganese will need great quantities of Electricity and coal can be used in producing part or all of it.

It was therefore decided to include in the Second Industrial Plan a project for the exploitation of coal in the area of Bedaa & thora with a capacity of about 200,000 tons per year, the optimum capacity will however be determined when the investigation for coal deposits are completed.

## Different Other Ores

### 14. Project for exploiting talc, Barytes, Muscovite, Sulphur, Vermiculite & Asbestos

Aims of the Project:

The country produces ore of talc, Barytes, Muscovite Sulphur, Vermiculite Asbestos. The production of some of these minerals satisfies the local consumption and some other minerals are imported, a third group is exported such as talc and Asbestos. The Egyptian talc - steatite is one of the best kinds in the world. The country exports about half of the European consumption, where it is used in the manufacture of high voltage insulators.

The country produces its needs of talc for cosmotics, insecticides and dusting in agriculture. As for sulphur the country imports some quantities for agricultural purposes, for the manufacture of sulphuric acid for the rayon industry and for insecticids etc. These quantities amounted to 15,000 tons in 1957.

The project aims to extract about 4,000 tons of talc over the present production 8,000 tons of Barytes, 250 of Muscovite, 2,000 tons of Sulphur 200 tons of Vermiculite and 500 tons of Asbestos, for the local consumption and for export.

### 15. Expansion in the production of Silica Sands for Glass Industry

Aim of the Project:

The glass industry depends on mixing the imported sands with the local production. The country produced in 1957 about 6000 cubic meters of Silica sands for the glass industry, the value of which is estimated at L.E. 18,000. The country imported at the same time about 7000 cubic meters of sands with a value of L.E. 46,000. Besides the country imported crystal and glass ware amounting about L.E. 58,000 worth.

The project scheduled in the second industrial plan for industry aims for using Egyptian sand in the manufacture of different kinds of glass if the Egyptian sands can be prepared so that it will be fit for the manufacturing of all kinds of glass. It is expected at this moment

Mediteranean countries, such as Greace, which isimporting rounds from Holland & Belgium.

The capacity of this project is 20,000 subic motors per year of silica sands that can satisfy the local needs of the glass industry.

6. Rifining of Salt & increase of its production

Aim of the project

The country gets its table salt from the salt-works in Port-Said, Alexandria, Resetta, Edko, Balteim, Manzala and Marsa Matrouh, together with other small salt works on the shore of Damietta. The local production is about 400,000 tons per year and can be increased up to 600,000 tons. Salt is used locally for food, the Caustic Soda industry, tanning and textile industries and in ice-cream. The production is more than the local consumption which is estimated at about 150,000 tons per year.

The Egyptian salt has a firm position in the international markets as the export amounts to about 250,000 tons per year and was increased to 350,000 tons in 1958.

This project aims to increase the production upto 600,000 tons per year instead of 400,000 tons so that the local market can have its needs which will increase by the progress in the industry of Caustic Soda ..... etc, and also for export. The project aims to increase the productive capacity of the Salt Reffinery from 40,000 to 160,000 tons per year to meet the requirements of the local market

7. Increase of Gold Milling

The eastern desert contains few gold mines working in mining gold bearing quarts veins, milling the ore and extracting the gold. The helps to increase the country's reserve of this procious metal and gives a reasonable profit for the industry itself.

The country's production amounted up to 20,000 ounces per year the investigations made in the last years proved the possibility of exploiting other quarts veins.

Thisproject was planned to mine quantities of ore sufficient to increase the gold production by 2250 ounce per year approximately after the investigation are completed.

8. Increase in the production of marbles and ornamental stones.

Aim of the project

Marble and other rocks as alabaster, serpentine, and granits are used in building industry in the country. The crushed material is also used in the manufacturing of mosaic slabs & flooring materials. The country imports some kinds of marbles which is not available in the local quarries, although the Egyptian marbles from Wadi Maya is same as the Italian marble Karara,. Other kinds of marbles of different colours are present and there is nothing to justify the imports of marbles which amounted to about 400,000 £ in 1958.

The present production of marbles is estimated to be about 4000 cu.meters while the countries consumption is about 7300 cu. meters. The project aims to the increase of the production of marbles from quarries and the expansion of cutting and polishing facilities. The increase in the capacity is estimated to be enough to produce about 7000 cu.m, which is sufficient for the local consumption and some for export.

. Production of Iron oxides for Pigments

Aim of project :

Iron oxide deposits of different colours are present in the Eastern desert. These deposits contain ores suitable for the pigments. Red, yellow colours and their desivatives can be manufactured. At present most of the materials needed for pigments are imported.

The project aims to mine, these deposits and also to dressing, grinding and pulverising these ochres for the local pigment industry and for export if possible the proposed capacity is producing about 3000 ton/year of pulverised ochres.

. Increase of Production of Basalt.

Aim of project :

Basalt is considered one of the most important rocks for road - paving for reinforcing the railway embankments. The present yearly production from of Basalt is approximately 250,000 cubic metres , But the increasing demand for basalt to cope with the expansion in road-paving a well as for railways necessitates an increase of about 200,000 cubic metres per year from the different sizes. The project includes quarrying equipment as well as crushing & screening plant for the increase in the production i.e. 200,000 cm. meters/year.

. Production of Graphite.

Aim of project :

Graphite is found in various localities in the Eastern desert. Many samples of this ore have been collected in the course of the 1st. industrial plan and were tested in the laboratories of both Ministry of Industry and Cairo University. Satisfactory results were obtained which gave graphite - concentrate of 60% that could be used in foundry workings. It has been also possible to obtain concentrate of 85 - 90% suitable for the manufacturing of lead-pencils. Further, it was possible to obtain a concentrate of 98.6% and investigations are being carried out to obtain electrode grade concentrate

The present yearly consumption is about 300 tons from the different grades, which costs more than £ 10,000. It is expected that this local demand shall increase after the completion of executing the caustic soda project, the manufacturing of dry - batteries, and the expansion in the iron and steel industry.

An agreement has been concluded with one of the Specialised Firms in Western Germany, in accordance with the technical aid program, to carry out further investigations for graphite concentration, as well as industrial tests on the concentrates, with a view of knowing their field of use in industry. As this study is expected to be finished by August 1961 i.e. during the 2nd industrial plan, it was decided to include in this plan a project for graphite exploitation and concentration, to produce the grades already produced in local laboratories, that are suitable for the making of lead - pencils and for foundries. The proposed productive capacity for the project is 1000 tons of 60% concentrate & 20 tons of 90% concentrates.

However, this should be adjusted in the light of the results of the study concerning the ore-reserves, bearing in mind that if such reserves permit the exploitation of quantities more than that required, the excess could be devoted for foreign markets.

## 2. PROJECT FOR ILMENITE CONCENTRATION:

Ilmenite deposits occur in the Eastern Desert at Abu Ghalaga rea about 30 kms from the Red Sea Coast. The deposits are estimated to ore than 10,000,000 tons. This ore is now being exploited at a maximum apacity of 100,000,000 tons/year. The ore contains about 40 - 42 % $TiO_2$ hich is rather on the low side as a titanium ore.

It was thought of investigating methods of concentration of this re either mechanically or metallurgically producing in this latter case itanium slag and pig iron. During the Ist industrial plan a project as executed for mining, transportation, crushing and shipping of the ore. lso a contract has been concluded with the German firm Demag to carry out nvestigations for the concentration of the ore, production of titanium lag and pig iron and titanium white. These investigations are expected o be completed about 1961 which necessitate the execution of the project uring the 2nd industrial plan according to the results of the investigations.

This project only includes the Ist stage of concentration by echanical means if the results of the tests will be successful and could e applied economically on an industrial scale. The capacity of such a lant is estimated at 30,000 tons per year which is slightly more than the mounts of fines expected to be produced during crushing the ore to produce he normal shipping ore.

## H) LEAD & ZINC ORES:

### . EXPLOITATION OF UM GEIG LEAD & ZINC ORES:

Aim of Project:

Lead-Zinc mines occur at Um Geig about 55 Kms south of Kossier the Eastern Desert. These mines have been worked since several years the production of galena on a very small capacity. The ore contains phides of lead and zinc as well as oxides silicates and carbonates of two minerals (20% & 4 % P6 on average). The deposit consists of oxidised zone under which lies a sulphide zone. Through the Economic and hnical cooperation agreement **with** the Soviet Government thesis deposits e been investigated from all points of view. The reserves of the dised zone have been studied and it was proved during the Ist stage of loration the amount of zinc that could be extracted amounts to about 600 tons. The 2nd stage of exploration proved the over 80,000 tons of c metal could be extracted from the oxidised reserves. Investigation the ore is being carried out in the U.S.S.R. in order to know the best hod for the concentration of the ore as well as the metallurgical atment. Prospecting is going on to study and determine the other dised reserves in the mine area as well as the sulphide reserves eath the oxidised zone. The project aims at the exploitation of the dised zone in the next 10 - 15 years, then the sulphide zone would be loited.

The investigation of the oxidised ore is expected to be completed hin 1961 and, therefore, a project would be executed having a capacity ugh to produce about 5,000 tons of zinc metal/year. This capacity will isfy the need of the local industry. If the investigations and studies l prove that such capacity is below the minimum economical unit increasing capacity of the zinc metal producing unit or producing another marketable duct from such ore will be considered.

## 4. CONCENTRATION PLANT FOR LEAD ORES AT UM GHEIG & ZOG EL BEHAR

Aim of Project:

Owing to the needs of the country for lead and to the fact that he amount of lead to be extracted from Um Gheig Zinc mines will not satisfy he local industry demands, it was thought to produce lead from other ources. At Um Gheig occur an old tailing dump which contains lead inerals that could be extracted economically. Also at Zog El Behar a ead mine that has been worked several years ago occurs some lead deposits f valuable contents.

The project aims at erecting two concentration plants, one at m Gheig for the treatment of the tailing at the old dump and the other at og El Behar. The lead concentrates from these two plants shall be smelted n the existing plants and would satisfy the deficit in the demands of the ocal industry. The capacity of the two plants should be sufficient to roduce about 3,500 tons of about 50 % lead concentrate. This concentrate ould allow for the extraction of about 1,500 tons of lead metal per year. his amount together with the lead extracted from the Um Gheig Zinc mines nd the scr[illegible] [illegible] would satisfy the local demand which is represented y the cable manufacturing, batteries and other industries. The proposed apacity is a temporary one until the prospecting of the deposit is ompleted and then expansion to the optinum capacity will be executed.

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## II. MINERAL PROSPECTING PROJECTS

### 1. COAL PROSPECTION:

Coal is considered essential in several industries, such as iron, steel, electrical and thermal power and chemical industries. The iron and steel industry needs according to its scale of production by the end of Ist industrial plan about 500,000 tons of coal yearly.

According to the expansion indicated in the 2nd industrial plan, the required coal quantities will jump upto 1,000,000 tons yearly.

During the Ist industrial plan, the coal prospection began in different localities in Sinai peninsula, which if succeeded, a considerable amount of the local consumption will be produced of qualities suitable for the electrical and thermal power and chemical industries, and it may be used after mixing with the imported varieties in the iron and steel industry. Thus it is necessary to continue the research work in other new localities looking after better varieties fit for coking.

That it is why the 2nd industrial plan includes a project for coal prospection in Sinai Peninsula, Abu Rawash, El Khatatba, Oasis of the Western Desert and Edfou Area. Detailed study for these areas will be carried out to know the quantities of coal present in each area, its qualities and the suitable method for extraction, dressing and its industrial uses. The 2nd industrial plan included carrying out the prospecting work investigations as well as providing of equipment necessary for such work.

## . PROSPECTION FOR COPPER ORES:

Copper is one of the most essential metals for several inportant ocal industries. The country did not begin yet producing copper ores although he country consumes about two million Pounds worth of copper metal each year.

In Ist industrial plan prospection for copper ores began in Um amuki and Abu Sowail areas. A contract has been concluded with the zechoslovak Foreign Trade Corporation to participate in studies needed in m Samuki area. Also a contract has been concluded with the German Firm emag according to the German Technical assistance to participate in the tudies needed in Abu Sowail.

Research work in Um Samuki area are now in advanced stages, that s why a project for exploitation of copper ores of that area was included n the 2nd industrial plan if the prospecting work will be successful. lso the prospection work should be continued in all other areas so we can roduce all our needs from the copper now and in future.

Therefore, a project for copper prospection in Abu Sowail, Hamash nd the areas near to Um Samuki in the Eastern Desert were included in the 2nd industrial plan. Also the equipment, tests, and investigation work necessary for such deposits are included.

## . PROJECT FOR PROSPECTION OF IRON ORES:

As the development of the iron and steel industry calls for an increase of the production of iron ore, and as the working mines have limited life, therefore, it is necessary to investigate for new deposits of iron ore as well as prospecting the nearby area of the working mines to find the extensions of ore, to meet the increasing demand for the ore needed in the developing iron and steel industry. According to the Ist industrial plan, the needs for iron are 550,000 tons yearly, while according to the 2nd industrial plan these needs are calculated to be 1,380,000 tons yearly.

As the Aswan Area is not yet completely studied, it was found necessary to complete the detailed studies of the areas surrounding the working mines to know the quantities present, quality and the methods of exploitation and dressing, and to be able to increase the production according to the prevailing conditions. Attention was also drawn to study the Baharia Oasis iron deposits to be able to begin exploitation when the transport facilities will be available, to meet the increasing demands on the iron ore, or to supply any quantities of iron ore that Asswan mines fail to produce in future due to unforeseen reasons.

During the Ist industrial plan, a contract was concluded with the Soviet Union for making some studies on the Baharia deposits. Also it is found necessary to make studies on other deposits in the eastern desert, and thus we can know the situation of these deposits during the 2nd industrial plan.

The prospection projects for iron ores include the Geologial and mining investigations to prove the quantities to determine the methods of mining and the dressing as well as to determine the metallurgical processing of the ore deposits in each of the three areas, viz :

1. Aswan
2. Eastern Desert
3. Baharia Oasis

4. PROSPECTING WORK FOR LEAD AND ZINC ORES:

Aim of Project:

The countries' yearly consumption is estimated to be about 4,000 tons of zinc metal and about 2,000 tons of lead metal. These quantities will be produced when the 2nd industrial plan is fulfilled. The reserves prospected until now although it will enable for the production of the needed amount but it does not give an ample supply for long term production. Also parts of the deposits are not yet investigated specially the sulphide deposits of Om Gheig. The project included prospecting investigation of lead and Zinc deposits to prove the reserves for the expansion of the industry and for longer life of metallurgical plants.

## 5. PROSPECTING FOR THE ROCK PHOSPHATE DEPOSITS:

### Aim of Project:

Phosphate is one of main mining industries in the country. Phosphate is exported to the Far East market as well as it supplies the local fertilizing plants with the raw material. To meet the expansion in mining the phosphate due to increased demands for both local consumption and export, also to keep the production at its level. New mines should be opened instead of the old mines which is very near to exhaustion. Due to these conditions it is thought to investigate new deposits in Sinia and the Oasis in the Western desert. The present production of phosphate is 500,000 tons/year approximately and it will be increased to 1,500,000 tons/year by the fulfilment of the 2nd industrial plan. The project includes investigations of the new deposits, detailed mining study as well as providing the equipment necessary for surveying, drilling, etc.....

## 6. PROSPECTING PROJECT FOR SULPHUR DEPOSITS:

### Aim of Project:

The country consumption of sulphur is estimated about 10,000 tons/year, and only 3,000 tons per year are produced from the gases of the oil refinery. The demand will be increased considerably from this element specially for the fertiliser plants, and for sulphuric acid production needed for the super phosphate industry as well as other industries. Owing to increased demand on sulphur and sulphuric acid for the local industry the 2nd industrial plan includes a special project for investigating, studying the newly discovered sulphur deposits. This project includes determining the quantities, methods of mining and treatment of these deposits as well as prospecting for others in neighbouring areas in the Eastern Desert and in Sinia.

## 7. PROJECT FOR PROSPECTING THE PEGMATITE ROCH CONTAINING FELDSPAR, BERYL & MICA :

Aim of Project:

Pegmatites occur in the eastern Desert and the project aims for prospecting work to be carried out in order to find out the localities where Feldspar, Beryl and mica may be exploited economically. All these minerals are needed for the local industry. If the deposits enables large production export will be considered to help the national economy.

## 8. PROJECT FOR PROSPECTING WORK FOR MOLYBDENITE :

Aim of Project:

This mineral is needed for the local industry and it is known to occur in places in the Northern parts of the Eastern Desert. These deposits were not exploited in the past due to insufficient data. The project includes detailed investigation to determine the quantity and quality of the deposits as well as its dressing and treatment.

## 9. PROJECT FOR PROSPECTING WORK FOR THE DIATOMACIOUS EARTH :

Aim of Project:

Diatomacious earth is needed for the local industry and the project includes carrying out of the necessary investigations and prospecting work as well as studies of the deposits in order to exploit the deposits if the investigations give successful results.

## 10. PROJECT FOR THE PROSPECTING OF MANGANESE ORES:

Aim of Project:

Manganese deposits occur in Sinai and the Eastern Desert. These deposits have been exploited several years ago at a capacity of about 200,000 tons/year mainly of low grade manganese assaying about 22 %.

In the 2nd industrial plan a project for a ferromanganese plant will be executed. This project will treat about 100,000 of manganese ore/year. In order to meet the future expansion of the ferromanganese production and the demands for export as well as to ensure a supply for the new ferro-manganese industry with the ore over a large number of years this project was planned. The project includes prospecting work to be carried out on the manganese deposits in Sinia as well as in the Eastern Desert.

## 11. PROJECT OF DRESSING INVESTIGATIONS OF CHROMITE DEPOSITS :

### Aim of Project:

Chromite is needed for the local industry. Deposits of chromite occur in the Eastern Desert and field prospecting work has been completed. The results proved that the deposits could be mined on a small scale just enough to meet the demand of some of the local industries. These deposits were not exploited as the grade of the chromite and its specifications does not meet the demand. The project aims to the dressing investigations of the ore in order to concentrate it and produce a suitable product for the industry.

## 12. PROJECT FOR INVESTIGATIONS OF ALUMINIUM PRODUCTION :

Aims of Project:

Aluminium is one of the most important metals needed for the local industry. Bauxite has not yet been discovered in the country until present, although it may be present in Sinia. Huge deposits of Kaolin is present in Sinia and clay deposits of large quantities occur in Asswan Area.

During the Ist industrial plan investigation connected with these deposits has been carried out. A contract has been signed with Salzgitter Industriebau in order to carry out field investigation on the different Kaolin and clay deposits as well as laboratory tests in order to know the possibility of producingAlumina from these deposits. If the investigation proves to be successful a project for producing aluminium will then be considered.

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## 3. CHEMICAL INDUSTRIES

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## 3. CHEMICAL INDUSTRIES

### I. BASIC CHEMICAL INDUSTRIES

1. Synthetic Wool
2. Phosphoric Acid Salts & Triple Phosphate Fertilizer
3. Nitro-Benzene
4. Aniline
5. Sodium Azide and Sodium Cyanide
6. Sodium Carbonate and Caustic Soda
7. Toxaphene
8. Chlorosulphonic Acid
9. Distillation of Coal Tar in Coke Factory
10. Expansion of Coking Plant, Helwan

### II. PULP, PAPER & CELLULOSE PRODUCTS INDUSTRIES:

1. Third Stage in the Racta Paper Company
2. Expansion and Renovation of the "Middle East Industrial Company" (SIMO)
3. Fifth Stage of the "National Paper Company"
4. Sixth Stage for the "National Paper Company"
5. Second Stage for Bagass Pulp Plant
6. Rags Pulp
7. Particle Board
8. Expansion in Producing Cardboard Boxes
9. Unit for Corrugated Cardboard Boxes for Exportation
10. Paper Cigarettes Filters
11. Viscose Cigarette Filters
12. Cigarette Paper Project

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III. CHEMICAL FERTILIZERS INDUSTRIES:

1. Expansion in Super Phosphate Production in the Abou Zaabal & Kafr El Zayat Fertilizers Co.
2. Expansion in Manufacturing Super Phosphate in the Egyptian Financial & Industrial Company at Kafr El Zayat
3. Production of Ammonium Sulphate (20.5 % Nitrogen)
4. Potassium Sulphate Production
5. Manufacturing Calcium Super Phosphate

IV. BUILDING MATERIALS, REFRACTORIES, CERAMICS & GLASS INDUSTRIES:

1. Vitrous Enamel Powders
2. Expansion in the Paints Industry
3. Production of the Consolidated Crystal
4. Coloured glass
5. Scientific Glass

V. PHARMACEUTICALS & COSMOTICS :

1. Pure & Medical Glucose and Vitamin C
2. Citric Acid, Sodium Citrate and Calcium Gluconate
3. Some Organic Solvents & Benzoic Acid & its Salts
4. Medical Cod Liver Oil
5. Saccharine and Chloramine (T)

VI. LEATHER TANNING INDUSTRY:

1. Project for the Construction of a Modern Tannery

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## II. TOBACCO & CIGARETTE INDUSTRIES:

1. Construction of a Chemical Laboratory for Control & Research

2. Construction of a Chemical Laboratory for the Control of Production and to Meet the Needs of Modern Evolution in the Tobacco & Cigarette Industry in the "Eastern Tobacco Co."

3. New Methods Introduced in the "Salonica Co." for Producing Tobacco & Cigarettes

4. Construction of a Chemical Laboratory for the Control of Production and Modern Evolution in the Tobacco and Cigarette Industry in the "Egyptian Tobacco and Cigarettes Co."

5. Construction of a Chemical Laboratory for the Control of Production and the Modern Evolution in the Tobacco & Cigarette Industry in the W.E.T.E.C. Company, Ltd.

6. Construction of a Chemical Laboratory for Control of Production and Modern Evolution in the Tobacco and Cigarettes Industry in the "Coutarelli Bros. Cigarettes Co."

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## I- Basic Chemical Industries

### 1. SYNTHETIC WOOL

Aims of the Project :

This project aims to exploit some of local materials to create the Industry of acrylate Fibres so as to replace partially the imported natural wool by using synthetic wool in about 50% of the uses of natural wool.

The industry of acrylate fibres (such as Orlon & Dralon) depends on saturated gases produced from the mazout coking project included in the first Program of Industrialization.

Synthetic wool is not manufactured locally and is not imported either at present. Regarding that the needs of the two provinces of the U.A.R. of raw and woven natural wool amount to about 6000 tons a year and are expected to increase up to 7000 tons per year in the next five years, and that synthetic wool can replace natural wool by 50%; it is thus expected that local demand of synthetic wool will be about 3500 tons during the year of 1965.

The capacity of the proposed factory for synthetic wool amounts to 4000 tonc a year. This factory is supposed to overtake all the stages of manufacturing until the stage of polymerisation. The two stages of spinning and weaving will be overtaken by the present local factories.

The project is suggested to be situated in the Suez area near the factory for Mazut Coking which will supply the project with its needs of saturated gases.

### 2. PHOSPHORIC ACID SALTS AND TRIPLE PHOSPHATE FERTILIZER

Aims of the Project :

The Synthetic Detergents Project included in the first Five Year program, needs about 8000 tons a year of Phosphoric Acid Salts to be used in the final preparation of detergents. It is suggested that a part of the Aswan Dam electricity could be used for the production of Phosphoric Acid needed to produce Phosphoric Acid Salts and Triple Phosphate fertilizer both for export and local consumption. The manufacturing of

Phosphoric Acid depends on the Egyptian Phosphate rock. This industry will consume every year about 75,000 tons of Phosphate rock with a value of 187,500 Eg. pounds, and some 7,500 tons a year of Carbonate with a value of about Eg. F. 150,000 which will be provided by the Sodium Carbonate project scheduled in the second Five Year Program for industry.

Phosphoric Acid Salts are not produced locally at the moment. They are not imported except for a small quantity of not more than 200 tons a year. The local demand for them is expected to amount to about 8,000 tons a year in 1963 and the following years, after the production of synthetic detergents. As for the Triple Super Phosphate fertilizer, it is known, according to the economic fertilizing rates, that the Egyptian soil needs about half a million tons of Phosphate fertilizers, (15,5%) every year. The present local production is about 18,000 tons a ye ar and is expected to increase up to 525,000 tons as a result of the execution of this project and the other projects scheduled in the second program for industrialization of Phosphate fertilizers, Said production is necessary for the Egyptian soil which will be acclaimed in 1965. The capacity of the proposed factory is 8,000 tons a year of Poly and Pyro-Phosphate salts, & 25,000 tons a year of Triple Phosphate fertilizer. It is suggested that it should be situated in Aswan to be supplied by cheap electrical power, as electricity is the most important element of production cost for such electro-chemical industry.

## NITRO-BINZENE

### Aime of the Project :

A project for the production of Dyestuffs and intermediate prepared from light oils resulting from the Coke Factory in Helwan. has been scheduled in the first Five Year Project. Aniline is considered one of the most important materials needed for in Pharmaceutical Chemicals and dystuffs manufacture. Aniline is prepared industrially by reduction of Nitro-benzene. The project aims to invest the industrial capacity of nitration already in hand in the Military Factory. No. 18 to furnish Nitro-Benzene to the Civil sector.

Nitro-benzene is an intermediate material for the manufacturing of Aniline of which we now import about 350 tons, this will increase up to 600 tons a year in the next five years, when the factories of dyestuffs and Pharmaceutical Chemicals start production. The capacity of this Nitro Benzene production unit is 750 tons a year (one shift).

The project is to be situated in the Military Factory No. 18 in order to make use of its equipment for Nitration and concentrating residual acids, and also its maintenance equipment.

4. Aniline

Aims of the Project :

This project aims to satisfy the needs of the two factories of Dyestuffs and Pharmaceutical chemicals as previously mentioned in the Nitro-Benzene project.

The quantity of Aniline (Aniline Salts) imported is now about 250 tons a year and will attain the figure of 600 tons in the next five years when the two projects of Dyestuffs and Pharmaceutical Chemicals are realized.

The capacity of the proposed unit is 570 tons in one shift. The project is to be situated in the Military Factory No. 18 in order to make use of its possibilities and its situation near the centers of the consumption of Aniline, which are: the factories of pharmaceutical chemicals and of Dyestuffs.

5. SODIUM AZIDE AND SODIUM CYANIDE

Aims of the Project :

Sodium Azide is considered an important startegic material and its export - similar to that of explosives - is subject to the approval of authorities. Some foreign states fefused to export this material to the Egyptian Region at the time of the Suez War.

Average local consumption of Sodium Azide is estimated at about 2,5 tons a year for producing Lead Azide which is used - non rivaled or replaced - as a starting explosive for difference sorts of industrial explosives and munition. It is considered that importation of this

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The project is suggested to produce Sodium Azide and Industrial Sodium naide, all raw materials are in hand locally except for the Metalic Sodium, ustic Soda will be produced as a by-product of this industry. The average cal consumption is edtimated at 2,5 tons a year of Sodium Azide, and 30 tons year of Industrial Sodium Cynaide. All those quantities are imported from road.

Annual productive capacity of the suggested factory will be :

2,5 tons of Sodium Azide
23 -26 tons of Industrial Sodium Cynaide
1,5 tons of Caustic Soda as a by-product

This unit is to be situated in Military Factory No. 45 in order to e its capacities and get the benefit of its location near the centers of nsumption.

## DIUM CARBONATE AND CAUSTIC SODA

ms to the Project :

Sodium Carbonate and Caustic Soda are both considered as basic emicals required for most of the chemical industries. As such the duction of these two materials is considered as a fundamental step in e program planned for chemical industries.

Sodium carbonate is not produced locally. It is expected that the cal consumption in 1965 will need about 61,000 tons a year in order to lfill the needs of the glass as well as different Sodium salts and ustic Soda industries, and to cover the needs of the northern Province th this material. As for Caustic Soda it is at present produced locally thin the limits of 2500 tons a year, which will be increased to 22,500 ns when the factory of "Misr Company for Chemicals" scheduled in the rst program begins its production. Regarding that the country will need out 44,000 tons of Caustic Soda in 1965, the deficit of local production Caustic Soda will be of about 21,500 tons every year.

The capacity of the factory suggested will be 70,000 tons of Sodium Carbonate and 25,000 tons of Caustic Soda per year.

The factory is to be located in Alexandria area where most of the raw materials necessary are to be found, centers of consumption are near, and exportation to the Northern Province is easier.

## TOXAPHENE

Aims of the Project :

Toxaphene is used as an insecticide against cotton insects. It is ne of the chlorinated Hydrocarbons, and is manufactured by treating camphene with chlorine.

The per centage of chlorine in toxaphene ranges between 67% & 69% by weight. Toxaphene is used in form of emulsion 60% in Kerosine or other solvents. The Hercules Company has a monopoly, for the production of both camphene and toxaphene Camphene is produced from turpentine sulphate residual of paper manufacturing in America.

Regarding thatToxaphene is used for the protection of cotton, which is the main agricualtural product of the country, and that producing Toxaphene locally will make use of the great quantities of the locally produced chlorine, thus saving a great part of foreign currencies now spent for said importation, the Ministry of Industry and the Ministry of Agriculture paid great attention to the construction of a factory for producing Toxaphene by treating the camphene imported from the Hercules Company with Chlorine.

Toxaphene is not produced locally. Imported quantities of 60% emulsion amounted to 3,500 tons in the 1956-57 season and increased to 12,000 tons in the 1957-58 season. It is expected that these quantities will increase gradually due to the success ofToxaphene in combating cotton worm and due also to the appreciation of its value by the Egyptian farmers in fighting agricultural insects. It is considered that the country will need about 32 to 35,000 tons a year of Toxafene to be used in all cotton planted areas.

Productive capacity of the suggested factory will be about 10.000 tons of Raw Texaphene, equivalent to 16,000 tons of Texaphene 60% emulsion. This capacity is within the limits of the local consumption in the two region of the Republic, and can be increased in future if necessary. This unit can also be used for producing any other insecticide of the chlorinated group, which does not need high temperature of pressure, The Toxaphene factory is suggested to be built near the Caustic Soda factory in Alexandria in order to obtain easily the chlorine which presents 70% in weight of the Toxaphene.

## 8, CHLOROSULPHONIC ACID

Aims of the project :

The unit for the production of Sulphonamides annexed to the Pharmaceuti. Chemicals factory in AboutZaabal needs about 850 to 1,000 tons per year of Chlorosulphonic Acid, which represents 80% of the essential materials for producing Sulphonomides.

Chlorosulphonic Acid is a chemical that needs great care while being transported from one place to another because it is easily decomposed in the presence of moisture producing harmful gases and vapours & thus making its importation rather difficult. Therefore, and because raw materials necessary for its production are at hand, it has been thought to build a unit for producing it locally.

It is likely that when the factory at Abou Zaabal Starts producing Sulphonamides, the local demand in the years following 1963 would be within 850 to 1,000 tons a year. The productive capacity of the proposed plant will be 5 tons a day, that is approximately 1,500 tons per year, this capacity being the smallest economic one.

This unit is suggested to be in the Pharmaceutical Chemicals factory in Abou Zaabal, if the liquid process is going to be used for the production of the acid. The acid will thus be used for producing Sulphonamide in the same factory. The dangers of doconposition of this acid will be avoided, bedides the possibilities of using some of the equipment of the Military Factory No.18. in Abou Zaabal, for concentrating Sulphuric Acid, which will be produced as a by-product.

## ) Distillation of Coal Tar in Coke Factory

### The Aims of the Project :

The coking plant at Helwan will produce 15 to 20,000 tons of Coal tar per year. This quantity was supposed to be burned or exported without being treated.

Regarding that tar is composed of oils of high industrial value, it was decided to distill this quantity of tar in order to make use of its different distillates in Pharmaceuticals, Plastic, Insecticides, Dyestuffs and other important industries.

Tar distillates are not produced locally. Some of the Chemical Industries existing or scheduled in the first five year program need some quantities of these distrillates, the rest can then be exported.

Productive capacity of tar distilling unit will be about 15 to 20 thousand tons a year.

It is suggested to erect this unit in the coke Factory in Helwan where raw materials & equipment are available.

## 0. EXPANSION OF COKING PLANT, HELWAN

### Aims of the Project :

The coke oven plant at Helwan was planned to satisfy the present needs of the factory of "The Egyptian iron and Steel Co." Due to what was decided lately to enlarge the capacity of the Iron and Steel Factory twice as much as it is at present, it was suggested to double the production of the Coke plant at Helwan to provide Coke for the iron & Steel works.

The productive capacity of the suggested expansion is 280,000 tons of Coke (over 60 mm) which will satisfy the planned expansion in the Iron & Steel Factory.

## II. PULP, PAPER & CELULOSIC PRODUCTS INDUSTRIES

### THIRD STAGE IN THE "RACTA" PAPER COMPANY:

#### Aims of the Project :

The productive capacity of the "RACTA" Company is about 24,880 Tons of all kinds of printing and writing paper. The local consumption of these two kinds of paper is estimated to be about 27,000 tons, and is expected to increase up to 36,000 tons by 1965, due to the progress in education.

Therefore, it is suggested to add a new integrated unit to the "RACTA" Company with a capacity of 12,000 tons per year, in order to cope with the expected increase of local consumption.

Small quantities of writing and printing peper are now being produced in "The National Paper Co." by using imported pulp. The country gets through importation about 90% of its needs, which reached about 26,500 tons of printing, writing and drawing paper in 1957 & 1958 (i.e. a value of £ 2,250,000). The "Racta" Factory is expected to start producing by the end of 1961 with the capacity of 24,000 tons per year, using local made pulp.

The productive capacity for the suggested unit is about 12,000 of printing and writing paper and 2,500 tons of excess pulp that can be used by other paper factories.

### 2. EXPANSION AND RENOVATION OF THE "MIDDLE EAST INDUSTRIAL COMPANY" (SIMO):

#### Aims of the Project:

This project aims to the renewal of the machines of the "Middle East Industrial Company" in Musturoud, and to complete it by adding new machines in order to make use of the Company's capacities. This project will rais the standard of production and the quantity produced from 6,000 to 14,000 tons a year of wrapping paper, retograph, printing paper, medium degree paper which is used for indulated cardboard and for making spools.

Local consumption of high wrapping quality paper is about 9,000 tons a year and is expected to reach 14,000 tons in 1965, whereas local production is about 9,000 tons. The suggested unit will produce 1,500 tons to satisfy the local consumption after the fifth stage of the "National Paper Company" starts working. This unit will also produce 4,000 tons of Rotograph printing paper used mostly in magazines and books, of which is imported yearly 10,000 tons. The production expected of medium grade paper and paper for spools and packing will satisfy the expected demands of the market in 1965.

The productive capacity will increase by 8,000 tons a year of different kinds of paper, which comprise the following :

4,500 tons of rotograph paper
1,000 tons of excellent wrapping paper
1,000 tons of both spools paper & packing paper
508 tons of medium grade paper used for boxes.

### 3) FIFTH STAGE OF THE "NATIONAL PAPER COMPANY"

Aims of the Project

The project aims to add a new unit to the "National Paper Co." for the manufacturing of high grade wrapping paper used for foodstuffs, medicines, fruits, vegatables and flowers. The country imports at present about 4,000 tons a year of this kind of paper, with a value of L.E. 480,000. This quantity is expected to increase due to the expansion in food and drug industries and also the increase in exportation of fruit, vegetable and flowers.

This paper can be produced in the factories of the "National Paper Co." near Rosetta by adding some machines for preparing the paste and a machine for manufacturing fine paper.

The productive capacity of the unit will be 40,000 tons a year of high grade wrapping paper, weighing from 20-60 grams per square metre. The first stage of this project will produce 3,500 tons a year.

### 4) SIXTH STAGE FOR THE "NATIONAL PAPER COMPANY"

Aims of the Project:

This project is an expansion to the present activities of the "National Paper Company" at Tabya in the Rossetta area, for producing thick wrapping paper, packing paper, pastil paper, spools, Poster, pulp tube and craft for wrapping. The production of these kinds of paper will satisfy the expected increase of consumption in 1965.

The quantities needed for local consumption of thick wrapping paper, packing paper, pastil paper and spools paper are produced locally at present. The production of the proposed unit is supposed to meet with the increase of consumption. As regards craft paper for wrapping it is all imported at the moment. The "General Company for Producing Craft Paper" will produce about 3,000 tons.

The productive capacity of the unit will be 6,000 tons per year of wrapping, packing, pastil, spools paper, cardboard, and craft paper.

## SECOND STAGE FOR BAGASS PULP PLANT

The second Five Year Plan includes several projects for the manufacturing of different kinds of paper. They need the essential raw material for paper which is pulp. This project has so been prepared to enable to double the production of pulp in the Edfou Factory Project (a project included in the first year plan).

The present local consumption of wood pulp imported for paper manufacturing is estimated at 5,400 tons a year. The annual local needs of chemical pulp in 1965 will reach about 74,500 tons when expansion projects in the first and second year plans start functioning. This project aims to increase the production of pulp in the unit producing pulp from bagasse at Edfu.

Productive capacity for the second proposed stage is 18,000 tons of pulp a year, comprising 15,000 tons of long fibre pulp for high quality paper and 3,000 tons of lower pulp used for wrapping cartons, packing paper and others.

## 6. RAGS PULP

### Aims of the Project

Although the paper-pulp factory at Edfu and the Pulp factory in the "General Company for writing and printing paper" (RACTA) will supply local industry with almost all its needs of pulp, It is yet that pulp must be mixed with imported wood pulps when used for producing high grade paper such as stams, documents, drawing paper, etc...

As cotton rags are available in the country and some companies are collecting and exporting them at present, this project aims to exploit these rags in making pulp which replaces all, or mast of the imported pulp, which is inferior to the rags pulp.

The RAKTA Company is supposed to import some 5,000 tons of wood pulp to be added to the rice straw pulp, in order to produce finer qualities of paper, The local market will need about 3,000 to 4,000 tons a year of rag pulp to replace the imported wood pulp.

The capacity of the proposed unit is 3,000 tons a year, it is suggested that this unit is to be added to the RAKTA Company to make use of its possibilities especially that the production will be used by the some mill.

## 7. PARTICLE BOARD

Aims of the Project :

The country imports about 250,000 tons a year of wood. The possibility has been studied for replacing some of the imported quantities, by producing particle board from local raw materials. Sudies for estimating the quantities of natural wood that would be replaced by particle board proved that this quantity would be 45,000 tons a year.

As the first Five Year plan includes the production of 30,000 tons particle board, the country will still need to build another factory for particle board as there is a shortage in the local production of about 15,000 tons every year.

It is suggested to build a unit with a productive capacity of 12,000 tons of particle board depending on Bagasses as a rw material, in one of the Egyptian sugar factories.

## Expansion in Production Corrugated Cardboard Boxes

Aims of the Project :

This project aims to increase the local production of corrugated carboard boxes used for packaging. The consumption of these boxes is tied to the progress in industrial production and in exporting yarns and food products.

The local production of these boxes is 5,000 tons a year. These boxes are not imported and as local needs exceed the production some factories are forced to use primitive packaging processes. The production of the suggested unit will cover the market needs and allow some export to the neighbouring countries. The second program includes projects for the expansion in producing craft paper for packaging and the inner layer necessary for the production of these boxes.

The proposed unit will increase the productive capacity of Moharem Press in Alexandria of corrugated cardboard boxes from 5,000 tons to 15,000 tons a year.

## Unit for corrugated cardboard boxes for exportation

Aims of the Project :

This project aims to produce corrugated cardboard boxes to be sold in great quantities in the Mediterranean Sea countries which export large amounts of its agricultural and animal products and needs therefore great quantities of boxes imported from abroad. Israel is now building a factory for manufacturing these boxes in order to export them to these countries.

Local production of corrogated cardboard boxes is now of about 5,000 tons which is all consumed locally. A project was prepared for expansion in producing corrugated cardboard boxes at Moharrem Press in Alexandria with a capacity of 10,000 tons per year in order to satisfy the local consumption. As for the new proposed unit its production will be destinated for exportation. Its capacity will be 25,000 tons of all sizes. The unit is suggested to be located in the Nouzha Area at Alexandria which is an industrial area where water ways, land transport and railroads are sufficient. It is also suggested that the unit should be added to Moharrem Press because of the facilities of space and technical knowledge.

## Paper Cigarette Filters

### Aims of the Project:

This project aims to produce paper filters used in filter tipped cigarettes. As the filter industry is a cmonopoly of a few companies all over the world, it is necessary to make an agreement with one of them to supply equipment and technical knowledge to the suggested unit in order to make its production comply with the sepcifications for accuracy and precision necessary in cigarette manufacturing.

At present the country consumes about 150 million rods of paper filters. A rod provides filters for six cigarettes. It is suggested to build a unit for producing 200 million rods to satisfy the present consumption and the expected increase. The productive capacity of this unit will be 200 million rods a year enough for about a billion and two hundred million cigarettes in the first stage. The production can be doubled by working two shifts daily. It is also possible to work three shifts to produce 600,000,000 rods a year if the consumption allows it.

This unit can be added to the Moharrem Press factory in Alexandria as the company studied the project with a producing company in Switzerland. This factory is suitable in its location because fluvial, land, and railroad transport are easy and because it is situated in an industrial area, and power steam and electricity are already available in the factory.

## Viscose Cigarette Filters

### Aims of the Project :

It is to produce Viscose cigarette filters which is imported from abroad in spite of the presence of the principal material necessary for this production in the country: Rayon fibees.

The present local consumption of viscose cigarette filters is estimated at 35,000,000 rods. It is therefore suggested to make a unit for producing 400,000,000 rods in two daily shifts to cover the local consumption and the expected increase in future.

As this unit will sell its products to cigarette companies it is to be built in Cairo where most of the cigarette firms work.

Cigarette Paper Project

Aims of the Project:

The country depends on importation to satisfy its needs of cigarette paper. As this industry depends on flax, and some chemicals which are locally available, this project was prepared to manufacture cigarette paper from local raw materials. This industry needs special technical knowledge, it is therefore suggested to realize this project by agreement with one of the international companies specialized in cigarette paper manufacturing in order to guarantee its quality and its fitness for cigareete manufacturing without affecting the cigarette's flavour.

Local consumption is estimated to an average of about 850 tons of a value of £ 285,000 which is all imported. The unit suggested has a capacity of 1,500 tons of cigarette paper every year which is the smallest economic size. The surplus of production can be exported to Arab countries.

It is preferable to build this unit near the consumption centers, that is cigarette companies in Cairo.

## III. Chemical Fertilizers Industries

### . EXPANSION IN SUPER PHOSPHATE PRODUCTION IN THE ABOU ZAABAL & KAFR EL ZAYAT FERTILISERS CO.

ims of the Project :

Phosphate fertilizers are used increasingly for fertilizing different rops. The local production of these fertilizers is about 180,000 tons whilst ffective needs of the Egyptian soil is estimated at about half a million tons er year.

The Abou Zaabal & Kafr El Zayat Co. produces Super Phosphate fertilizer ince 1948 by treating local phosphate rock with Sulphuric Acid. This latter s produced by burning the imported Pyrite and transfering the resulting Sulphur ioxide into Sulphuric Acid.

Since 1953 it was forbidden to import Phosphate Fertilizers due to the ncrease of the production of the two factories compared with the needs of the ountry at that time. Consumption then increased due to the increase in urchasing power and the importance given to fertilizers; it now attains 180,000 ons, since while it was 120,000 tons in 1954, and is expected to surpass more han half a million tons of fertilizers according to the economic fertilizing ates of the present cultivated land.

It is suggested to add a new unit for manufacturing sulphuric acid o enable the AboutZabaal & Kafr El Zayat Co. to increase its production of uper Phosphate.

This unit will have a capacity of 70 tons daily of sulphuric Acid; quivalent to 56,000 tons of calcium Super Phosphate Fertilizer (15,5%) per ear, with a value of £ 570,000.

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### . EXPANSION IN MANUFACTURING SUPER PHOSPHATE IN THE EGYPTIAN FINANCIAL AND INDUSTRIAL COMPANY AT KAFR-EL-ZAYAT

Aims of the Project :

This project aims to increase the company's production of Super Phosphate by 120,000 tons a year in order to satisfy the increasing needs for Phosphate fertilizers.

At present the Company produces Sulphuric Acid necessary for it by using imported Pyrite-ore. The expansion project is planned so as to use the pyrite process.

The country consumes the whole local production of Super phosphate fertilizer, that is 180,000 tons. It is expected that importation will be necessary to satisfy the urgent needs for this fertilizer.

A unit with a producing capacity of 150 tons of sulphuric acid per day is suggested. This quantity is equivalent to about 120,000 tons of Calcium Super Phosphate fertilizer (15,5%) to be consumed all by the local market as expected.

This unit is to be built in the factories of the Egyptian Financial & Industrial Co. at Kafr El Zayat.

## PRODUCTION OF AMMONIUM SULPHATE (20,5% Nitrogen)

### Aims of the Project

This project aims to produce 200,000 tons a year of Ammonium Sulphate fertilizer. Ammonia will be produced by using gases from the two factories of Coke and of the iron and Steel works Ammonium Sulphate will be then produced by double decomposition between Ammonium Carbonate and Calcium Sulphate (Gypsum).

Thus the Industry can depend entirely on local materials and it will not be necessary to build a unit for producing Sulphric Acid by using Sulphur or Pyrite imported from abroad, when the process of direct reaction between Ammonia and Sulphuric acid is used.

The local consumption of Nitrogen fertilizers (15,5% nitrogen) is likely to reach the figure of 1,470,000 tons per year in 1965, according to the economic fertilizing rates for the present cultivated land area and the agricultural expansion after the land of Upper Egypt is converted to permanent irrigation system.

The local production of Nitrogen fertilizers in the China Factory at aswan & the Fertilizer and Chemical Industries in Suez is estimated at 1,185,000 tons of fertilizers (15,5%)

It is evident that there will be a shortage of about 280,000 tons of Nitrogen fertilizers (15,5%), a quantity little over 200,000 tons of fertilizers containing 20,5% of Nitrogen.

The capacity of the proposed factory is 200,000 tons per year of mmonium sulphate fertilizer containing 20,5% of Nitrogen.

This project is suggested to be situated in the Helwan area aside the Coke factory and the Iron and steel factory, regarding that it depends using the gases of the two factories for producing Ammonia.

## POTASSIUM SULPHATE PRODUCTION

### Aims of the Project :

Potassium is an essential element for the growth of plants. It began to be used in the Egyptian soil within limited scale. The country imports a quantity of Potassium Sulphate for fertilizing. Considering that the liquid remaining from the distilling of alcohol in the distilling factory at Hawamdia contains great part of Potassium Salts, this project was made to extract Potassium Salts from the residuals of the distilling factory, by concentrating the liquid remaining from the distilling of alcohol and using it as fuel for generating power steam for the factory, and then the remaining ashes will be treated by Sulphuric Acid, finally the two materials of Potassium Sulphate and Potassium Choloride are isolated from the solution by crystalization.

Potassium Sulphate is not produced locally. The country imports Potassium fertilizers in quantities that reached 4500 tons of a value of £ 91,000 in 1958, The average local consumption of these fertilizers is estimated at 4,000 tons a year (48% concentration).

The suggested unit will produce enough Potassium Sulphate for the local consumption. The excess of Potassium Chloride and Potassium Sulphate will be exported. The productive Capacity of this unit will be 4,000 tons per year of Potassium Sulphate (95%) and 1,200 tons of Potassium Chloride (90%). The concentrated liquid resulting from the distilling of alcohol can be used as fuel for generating power steam equivalent to 6,000 tons of Mazut. This unit will use the liquid remaining from the distilling of alcohol in Hawamdia, for extracting Potassium Salts. This liquid will be used after concentration, as a fuel for generating power steam for the distilling factory, and thus the unit is suggested to be built in the distilling factory in Hawamdia.

## . Manufacturing Calcium Super Phosphate

Aims of the Project :

This project can not start before the expansion of the two factories : "The Financial and Industrial Co." and "The Abou Zaabal & Kafe El Zayat Co." and after having a keen idea of the possibilities of making Triple Phosphate in Asswan. It is expected that a unit for industrializing Zinc and Copper Ores will be built near Kosseir on the Red Sea, producing about 50,000 tons of Sulphuric Acid as a by product. This quantity can be used for producing Super Phosphate for local consumption or exportation.

Another suggested location is Nag Hamadi to exploit the Phosphate rock of the Sebaia Area, and to supply the Southern Mouderiehs of Upper Egypt and the New Valley with their needs of Phosphate fertilizers.

The country uses at present all the local production of Super Phosphate, about 180,000 tons a year, and it is expected that great quantities of Super Phosphate will have to be imported in order to satisfy the increasing local consumption of this fertilizer until the projects of expansion of the two factories of fertilizers have started to work. Local consumption is expected to reach 500,000 tons a year in 1965.

This project aims to supply the areas near Nag Hamadi with their needs of Phosphate fertilizers. The capacity of the suggested unit is about 130 tons per day of Sulphuric Acid equivalent to 100,000 tons of Calcium Super Phosphate fertilizer(15,5%) with a value of about £ 1,100,000.

Nag Hamadi was suggested for this unit because of its nearness to the Phosphate mines in Sebaia, and because the factory is supposed to supply Southern mouderiehs of Upper with their needs of Phosphate fertilizers. If the project for industrializing Zinc & Copper ores in Kosseir area starts and Sulphuric Acid is produced as a by product, this unit could be situated in Kosseir to make use of the Phosphate ore of the area. In this case the capital necessary for the unit will be of £ 350,000 less because it will not be necessary to build a unit for making Sulphuric Acid out of Sulphur as it will be in Nag Hamadi.

## IV. BUILDING MATERIALS, REFRACTORIES, CERAMICS AND GLASS INDUSTRIES

### . VITROUS ENAMEL POWDERS:

Aims of the Project:

Nine factories are working in the Southern Region to produce ousehold utensils, sanitary equipment, stoves and refrigerators. These factories use great quantities of vitrous enamel powder imported from abroad for coating its products. It is expected that local industry using these powders will expand due to the progress in the standard of living. This project was thus thought of in order to satisfy the needs of local consumption and to permit to face the increasing needs of the future and allows some of the production to be exported.

The local market consumes at present about 1500 tons a year of these powders and spends about £ 1,500,000 in Foreign Currencies for its importation. The capacity of the proposed unit is 2,000 tons per year. It is suggested that it is to be built in the industrial area of Mataria near Cairo, because it is near the centers of distribution where consuming factories are located

### 2. EXPANSION IN THE PAINTS INDUSTRY :

Aims of the Project:

It is expected that local consumption of paints will increase due to the steady improvement of the standard of living and due to the expansion in industrial projects, especially factories for cars, ships, refrigerators and other every day articles that need paints. It was, therefore, decided to make an expansion in the factory of "The Paints & Chemical Industries Co." in order to satisfy the increase of consumption in the following five years and to fill the needs of the northern Region. Some of the production can be exported to neighboring countries especially the Sudan.

The Southern Region consumes about 1,000 tons per year of paints nd high grade varnishes, this quantity is all imported at present. The orthern province also imports about 900 tons of paints with a value of 350,000.-

The factory of "the Paints & Chemical Industries Co." will start roducing in January 1960 with a capacity of 1,000 tons per year which is uggested to be increased by 1,700 tons to attain a total capacity of 2,700 ons per year.

## . PRODUCTION OF CONSOLIDATED CRYSTAL:

### Aims of the Project:

This project aims to produce the country's needs in heavy consolidated) crystal used for making mirrors, Sekurit panes and shop, xhibitions and museums windows.

This article is not produced locally and 2,600 tons are imported year with a value of £ 126,000.-

The capacity of the proposed unit is 200,000 square meters of thick rystal panes of 4, 5 & 8 mm.

This unit is suggested to be located in Yassin factories where here is three machines for the cutting, and smoothing of crystal panes which re not being used at present.

## . COLOURED GLASS :

### Aims of the Project:

Coloured glass is produced at present in limited quantities and in semi automatic way, which makes it full of defects and is easily broken. hat diminishes its possibility to be automatically bottled. This project was repared to furnish the Industries of Beer, wines, etc. with its needs of oloured glass conforming with the specifications, supporting pressure and it for automatic bottling.

The local production of coloured glass being not good for automatic ttling it has been necessary to import about 2,000 tons a per with a value £ 20,000.-

The capacity of this project is 3,000 tons that is 5 million bottles r year. The situation is supposed to be in the Al Shams factory for oducing coloured bottles for mineral waters on the Ismailia Canal.

## . SCIENTIFIC GLASS :

### Aims of the Project:

This project aims to satisfy the needs of universities, schools, stitutes, laboratories and pharmacies, for scientific apparatus such as ass tubes, measuring equipment and medical syringes, by using trained ersonnel in the country to produce these articles with modern equipments.

The local production of these apparatus is less than 7 tons per ear whereas the country imports about 14 tons per year with a value of 55,000.-

The proposed capacity is :

| | |
|---|---|
| 100,000 | Glass tube equipments |
| 100,000 | Medical syringes |
| 40,000 | Containers and measuring equipment |
| 3,000 | Pieces of glass used for Vacuum work. |

This unit is suggested to be located in the Ahram area or Dokki to e near the principal consuming centers.

## V. PHARMACEUTICALS & COSMOTICS

### 1. PURE & MEDICAL GLUCOSE AND VITAMIN C :

Aims of the Project:

Medical Glucose is considered one of the vital pharmaceuticals which should always be in hand for general therapeutic needs. Although the raw materials necessary for producing it are found locally, the country still depends on its importation from abroad under the form of powder for preparing its different solutions or as a solution in vials.

The import of Glucose and its preparations reached in 1958 the value of about £ 200,000.-

This project aims to build a unit for exploiting starch products to produce kinds of pure Glucose which could be used for the production of medical glucose, and for satisfying the needs of laboratories and factories. Some of it could be transformed chemically into Vitamin C, in another unit added to the factory, thus saving some of the foreign currencies spent in importing it to satisfy the local needs.

It has been considered that the project produces quantities of glucose sufficient to manufacture calcium Gluconate scheduled in another project of that program, as well as Hydrol necessary for the production of Penicillin in the Antibiotics factory.

The capacity will be as follows :

| | | | | |
|---|---|---|---|---|
| 25 | Tons | of Medical Glucose | | |
| 32 | " | pure Glucose | | |
| 32 | " | Glucose | for producing | Hydrol |
| 3 | " | " | " | Calcium Cluconate |
| 15 | " | " | " | Vitamin C |
| 40 | " | residues to be used for producing fourrages | | |

It is suggested to build this project in the area of the Pharmaceutic Chemicals in Abou Zaabal, to make use of the public services such as power, water and drainage.

## 2. CITRIC ACID, SODIUM CITRATE and CALCIUM GLUCONATE:

### Aims of the Project:

In producing Sodium Citrate and vials of Calcium Gluconate, local factories depend on importation of their raw materials from abroad. These factories also consume together with Sweets Factories great quantities of Citric Acid which is not produced locally.

The imported quantities of Citric Acid, Calcium Gluconate and its preparations reached a value of £ 50,000 in 1958.

This project was, therefore, prepared to produce the Citric Acid needed, and for producing Sodium Citrate by fermentation when using molasses a residual of the Cane Sugar industry.

It was decided to begin with a small producing unit. When the volume of consumption would increase in the two provinces the unit could be developed by adding equipment.

It was also decided to include this unit in the Antibiotics factory in Abou Zaabal, scheduled in the first plan, in order to make use of the experience in fermentation industries, and to save building and working expenses. Another fermentation for local pharmaceutical factories by using pure glucose which will be produced according to another project scheduled in this plan.

The capacity of the suggested project per year is :

| | | |
|---|---|---|
| 260 | Tons of | citric acid |
| 50 | " | sodium citrate |
| 4 | " | calcium gluconate |

## 3. SOME ORGANIC SOLVENTS & BENZOIC ACID & ITS SALTS:

Aims of the Project:

The project for producing Penicillin and Streptomycin included in the first Five Year plan, needs great quantities of organic solvents that are not locally produced at present.

To help the economic side of this project it was decided to include in the second plan, a project for satisfying its needs of Organic Solvents which could be produced locally by using Chlorine from the Caustic Soda factory with some petroleum gases.

The imported Ethylene Trichloride and Benzoic Acid and its salts amounted to £ 20,000 in 1958. This project is prepared to satisfy the Penicillin & Streptomycin factory with its needs of Ethylene Dichloride and Dichloro Anilide instead of importing it from abroad. The project will also provide Ethylene Trichloride for the local needs.

Benzoic acid and its salts are to be produced too, considering the facilities of its manufacture, and will thus satisfy the needs of local Pharmaceuticals and Food Factories for this acid and its salts.

The annual capacity of the project is :

| | | | |
|---|---|---|---|
| 100 | Tons of | Ethylene Trichloride | |
| 75 | " | " Dichloride | |
| 160 | " | Dichloro Anilide | |
| 25 | " | Benzoic Acid | |
| 160 | " | Hydrochloric Acid | by products |
| 40 | " | Calcium Chloride | |

## 4. MEDICAL COD LIVER OIL :

### Aims of the Project:

Cod Liver Oil is not produced locally at present, the imports amounted to about £ 50,000 in 1958.

The project for industrializing fish in Ras Allam on the Red Sea is expected to have a residue of about 480 tons per year of raw Cod Liver Oil. he project aims to purify 300 tons per year of this quantity irto medical od Liver Oil of high price that can be used partly to satisfy the local eeds instead of importing. The excess which is the biggest part of the roduction, can be exported to foreign markets. The Stearine which remains an be used in future to produce Vitamin A and D and its products.

The capacity is : 200 tons of medical Cod Liver Oil
40 " Stearine

It is suggested that the project will be in Suez because it is asier to get the raw Cod Liver Oil from Ras Allam on the Red Sea.

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5. SACCHARINE AND CHLORAMINE (T):

Aims of the Project:

Saccharine has a special importance as a none sugary sweet stuff used in medical purposes in cases of Diabetes Mellitus, and is used in manufacturing many Pharmaceutical preparations. Considering that the equipment of the experimental laboratory of the Pharmaceutic Chemical factory scheduled in the first Five Year plan, could be used with minor modifications, for producing this material, it has been thought of to take up for this project which will be of great economic importance to the factory of Pharmaceutic Chemicals. It will produce Saccharine in quantities necessary for the country, and Chloramine (T) used for sterilizing water.

These two materials are not produced locally at present and were imported in 1958 for a value of about £ 5,000.-

The capacity of the project per year is :

| | | |
|---|---|---|
| 5 | Tons | Saccharine |
| 1,8 | " | Chloramine (T) |

ebm.

## VI. LEATHER TANNING INDUSTRY :

### 1. PROJECT FOR THE CONSTRUCTION OF A MODEL TANNERY:

Aims of the Project:

This project aims to build a model tannery in Cairo grouping the mall tanneries using primitive ways and individuals working in the tanning ndustry. This model tannery will operate with technical ways. It will roduce mainly light leathers such as goat and sheep leathers that are vailable in the country, some of it can be exported. This tannery will roduce the same locally produced leathers but of a higher quality such as eather and soles for shoe making for local use and for exportation.

The local consumption of tanned leathers is 3,200 tons per year. lthough this quantity exceeds the local consumption, some products are not ufficient such as Patent leathers, chamoix, gloves and clothes leathers. he local production moreover, is not of a very high quality and needs much o improve.

The capacity of the new tannery per year is :

| | |
|---|---|
| 900,000 | square feet of shoe leathers (cows) |
| 25 | Tons of soles' leathers |
| 240,000 | Pieces (440,000 square feet) of sheep leather |
| 130,000 | Pieces (900,000 " " ) of goat leather |

This project is suggested to be situated in the new area which will be uilt by the Ministry of Municipal and Rural Affairs in the tanneries area at asateen near Cairo.

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## VII. TOBACCO & CIGARETTE INDUSTRIES:

### 1. CONSTRUCTION OF A CHEMICAL LABORATORY FOR CONTROL & RESEARCH:

Aims of the Project:

This project aims to install a chemical laboratory with modern equipment for analysing raw and manufactured tobacco for factories with no special laboratories and to overtake scientific and applied researches on tobacco, especially Syrian tobacco which will represent 30 % of the tobacco used in the southern province. This project aims to elevate the standard of production, and assure the similarity of quality of the products in a way that will permit exportation.

This laboratory is supposed to depend on the reinforcement fund of the tobacco and cigarette industry.

### 2. CONSTRUCTION OF A CHEMICAL LABORATORY FOR THE CONTROL OF PRODUCTION AND TO MEET THE NEEDS OF MODERN EVOLUTION IN THE TOBACCO & CIGARETTES INDUSTRY IN THE "EASTERN TOBACCO CO."

Aims of the Project:

This project aims to construct a chemical laboratory for the control of production in all stages and for the analysis of raw materials, products and subsidiary materials. The project takes up for the evolution of the industry in a way that makes it possible for the industry to follow the new automatic methods of international industry and to satisfy the increasing local needs for blended cigarettes (American type) that represents at present about 77 % of the cigarette's production, and for filter tipped cigarettes which was proved to retain a great portion of the tar stuff and nicotine and protects the smoker.

The increase in productive capacity will lead to economise in the cost of production which permits a decrease in the prices of cigarettes, especially the popular brands, and facilitates exportation. The proposed laboratory will overtake operations of examination and analysis necessary for the factory. It will solve the problems in the different stages of industry and manufacture 8,000 tons of raw tobacco per year to increase the production by 50% in order to face the increase expected both in consumption and export, and of course it will ameliorate the industry.

This laboratory is suggested to be constructed in the Easter Tobacco Company.

## 3. NEW METHODS INTRODUCED BY THE "SALONICA CO." FOR PRODUCING TOBACCO & CIGARETTES:

Aims of the Project:

This project aims to revolutionize the industry towards mecanization so that it can carry on with the International progress to satisfy the increasing local demand for filter tipped cigarettes and American type cigarettes and to face the necessary increase of the productive capacity and decrease of the production costs especially of popular brands.

The productive capacity of the project will be about 50 % of the present local production (250 tons per year) of raw tobacco at present, in order to meet the increase expected in consumption and export.

It is suggested that this project is made as an expansion to the Salonica Company.

## 4. CONSTRUCTION OF A SHEMICAL LABORATORY FOR THE CONTROL OF PRODUCTION AND MODERN EVOLUTION IN THE TOBACCO AND CIGARETTE INDUSTRY IN THE " EGYPTIAN TOBACGO & CIGARETTES COMPANY "

Aims of the Project:

This project aims to build a chemical laboratory for the control of production in its different stages, for the analysis of raw materials, products and subsidiary materials and to help the automatic evolution of the industry meet with the increase for the American type and filter tipped cigarettes, and to face the increase in productive capacity and the decrease of the cost of production especially for the popular products.

The capacity of the project will permit a 50 % increase in the present production (400 tons per year of raw tobacco) to satisfy the increase expected in consumption and export.

The project can be fulfilled as an expansion in the "Egyptian Tobacco & Cigarettes Co." by putting the chemical laboratory in it.

## 5. CONSTRUCTION OF A CHEMICAL LABORATORY FOR THE CONTROL OF PRODUCTION AND THE MODERN EVOLUTION IN THE TOBACCO & CIGARETTES INDUSTRY IN THE W.E.T.E.C. COMPANY, LTD:

Aims of the Project:

It aims to construct a chemical laboratory to control the production in the different steps of industry, to analyse raw materials, products and subsidiary materials to help the industry in its evolution towards satisfying local consumption which increases more for American type cigarettes and filter tipped cigarettes, and to face the necessary increase in the productive capacity and the decrease of the cost of production especially for the popular products.

The capacity of the project is 50 % of the present production, which is 450 tons per year of raw tobacco.

The project is suggested to be made as an expansion in the W.E.T.E.C Company, and to build a chemical laboratory in it.

## . CONSTRUCTION OF A CHEMICAL LABORATORY FOR PRODUCTION'S CONTROL AND MODERN EVOLUTION IN THE TOBACCO AND CIGARETTES INDUSTRY IN THE COUTARELLI BROS. CIGARETTES COMPANY :

### Aims of the Project :

This project aims to build a chemical laboratory to control the roduction in its different stages, to analyse raw materials, products, and ubsidiary materials, to push the industry forward to face the increasing emand for American type cigarettes and filter tipped cigarettes, and to ace the necessary increase in the productive capacity, and the decrease f the cost of production especially for the popular products.

The new production will give about 50 % increase in the present roduction resulting from the working of 2,000 tons per year of raw tobacco, face the increase in consumption and export.

The project is suggested to be made as an expansion in the COUTARELLI BROS. COMPANY" and to build a chemical laboratory in it.

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# 4. FOOD INDUSTRIES

## 4. FOOD INDUSTRIES

### ugar, Candies, Fementation, and Carbonated Beverages' Industries and Products.

) The Erection of Second Unit of the New Edfu Sugar Factory.
) The Expansion of Both Kom Ombo and Armant Sugar Factories.
) " " of Hawamdieh Sugar Refinery.
) Sugar-Can Wax.
) Glocial Acetic Acid
) Dried Yeast.
) Expansion of Wine Industry.
) Utilisation of Idle Capacities in Existing Sugar Factories and Repair Projects.
) Machanization of Halawa-Tehinia Industry.
) Candied Fruit.
) Utilization of Idle Capacity in E.B.O.T's Carbonated Beverages Factory.

### ereals, Cereal Products and Glucose.

) Modernization & Imporovement of Rice Mills.
2) Dextrin, Solubles Starch and Treated Starch Production.
) Concentration of Corn Steeping Water.
) Partial Replacement of Rice & Com by Sweet-Potatoes in Starch Industry.

### resh Packing and Food Preservation

1) Six Citrus - Fruit Packing Houses.
2) Six Fresh Vegetables' Packing Houses.
3) Peanuts & Peanut Products Factory.
4) Production of Sultona (Seedless) Raisins by Sun-Drying.
) Tuna Fish Cannery.
) Smoked Silver eels and Salted Sardines.
7) Onion Pickling Factory.
8) Three Frozen Vegetables & Fruits' Factories.
) Shark Liver-Oil and Fishmeal
) Extansion in Edfina Cannery to Produce Concentrated FruitJuices & Fruit-Butters.
1) Cold Stores & Freezers

### dible Oil and Essential Oil Industries.

1) New Cottonseed stores.
2) Cottonseed Decortication befor Pressing for oil Production
3) Refining Oil by Centrifuge.
4) Two Rice Oil Factories.
5) Extraction and Refining of Castor Oil.
6) Agricultural & Industrial Peanuts Company
7) Geranium Oil Extraction Factory.

### iary Industry

1) Milk Pooling Centres
2) Diary Factory at Damietta
3) Four Rairy Factories.
4) Two Experimental Milk Sterilizing Plants.

## I. SUGAR, CANDIES, FERMENTATION, AND CARBONATED BEVERAGES' INDUSTRIES AND PRODUCTS :

### 1. The Erection of Second Unit of the New Edfu Sugar Factory:

Purpose of the Project:

The first five year plan included the erection of a Sugar Factory at Edfu with a productive capacity of 40,000 tons a year. This suggested project aims at increasing the sugar production to meet the requirements of the continuously growing population and to export the excess with the aim of securing foreign currency, besides the increase of income in the sugar growing areas.

It is suggested to duplicate the production by installing a second unit in the Edfu Factory with the same productive capacity - 40,000 tons.

### 2. The Expansion of both Kom Ombo and Armant Sugar Factories:

The purpose of this project aims at increasing the sugar production of both Kom Ombo and Armant Sugar Factories from 100,000 tons to 120,000 tons a year. The increase in productive capacity will save a big portion of the capital necessary for the installation of a new independent unit.

### 3. The Expansion of Hawamdieh Sugar Refinery:

The purpose of this project aims at the expansion of Hawamdieh Sugar Refinery. After the expansion of the Edfu Sugar Factory by the erection of a new unit and after the increase of the productive capacity of the Kom Ombo and Aramant Sugar Factory, it becomes necessary to expand the Hawamdieh Sugar Refinery by increasing its productive capacity from 900 tons to 1200 tons daily.

### 4. Sugar-Cane Wax :

The purpose of this project is to dry residue of the filteration of the cane-sugar juice which contains about 12-13 % sugar-cane wax. It is suggested that a new unit be established at Kom Ombo for the extraction of this wax by organic solvents and refining it by isolating its fat, then bleaching its colour.

Since the project aims at the industrialization of an industrial waste, its productive capacity should be 1000 tons of wax a year to utilize all the residue containing wax produced by the Kom Ombo Sugar Factory.

The project will meet local needs and stop importing wax by foreign currency. The greater portion of the production will be exported because local consumption does not exceed 50 tons a year.

5. Glacial Acetic Acid :

Purpose of the Project:

The Vinegar Unit attached to the Hawamdieh Distillation Factory roduces 4,500,000 litres a year. But since the local consumption does not xceed 1,500,000 litres, it is suggested that the full capacity of the unit e utilized. The excess vinegar would be used in producing 900 tons of lacial acetic acid yearly to meet the local needs which amounts to 250 tons year. The increase in consumption is expected to reach 900 tons a year, fter the execution of the ethyl and butyl acetates projects.

. Dried Yeast:

The purpose of this Project aims at the reorganization and provement of the fermentation unit attached to the distillation unit of e Egyptian Distillation and Sugar Factory. The produced yeast will ntain about 52 % proteins and Vitamin B Complex; and can be used as a od for both human beings and animals.

Most of the production will be for export because local consumption limited to medical purposes.

To comply with alcohol production, the production of yeast will reach 00 tons a year, liable to increase if alcohol production is increased.

7. Expansion of Wine Industry:

The purpose of this project aims at the expansion of wine production of the "Société Viticole et Vinicole d'Egypte" (Gianaclis) in its factories at Nobaria, Beheira, from 4,000,000 litres to 7,000,000 litres a year to meet the increasing foreign demands of Egyptian wine which excels many foreign brands by its good qualities. The fields of this Company abound with the proper grapes for this industry and its factory is fully equipped for extracting the grape juice, fermentation, storage, aging and bottling.

8. Utilization of idle Capacities in Existing Sugar Factories and Repair Projects:

The purpose of this project aims at the utilization of the full capacities of the present factories and the removal of the old equipment to meet the increasing local consumption of sugar. The estimated increase of production after the repair amounts to 25,000 tons per year.

9. Mechanization of Halawa - Tahinia Industry:

Purpose of the Project:

Halawa Tahinia is a public food with a high nutritional value and it is widely consumed in all parts of the country. Its industry began small but developed and the amount of export increased gradually until it reached in 1958 - 500 tons at £ 60,000 - after it was in 1954 - 300 tons at £ 32,000. The present production of the factories reached 24,000 tons at £ 2,880,000 in 1958.

Since the principal stages of Halawa Tahinia manufacture are still carried out by hand in spite of the successful trials of producing it mechanically, it has been decided to mechanize the whole production in the "Egyptian Products & Packing Company" at Hawamdieh which is the largest factory for its production in the Southern Region. Very clean Halawa will be produced according to the latest hygenic and automatic methods, wrapped properly according to the required specifications. Besides, the project also aims at minimizing the production costs, meeting all the local consumption needs, and exporting the excess.

At the completion of the project its productive capacity will be 500 tons a year from the ordinary Halawa, fine white Halawa, shelled sesame seed and many others.

10. Candied Fruit:

The purpose of this project aims at the candying of fruit. Fruits suitable for candying are abundant especially the "Samani" dates which are one of the most important elements of this industry. Besides, the area cultivated fruit increases year after year as estimated in the Ministry of Agriculture plan for the coming five years. Sugar, the main element of this industry is produced locally and is expected to increase according to the Second Five Year Plan. The produced candied fruit in the Southern region barely meets the local consumption in spite of the increasing demand for it. In 1954, the local production was 25 tons at £17,500 while in 1958, it increased to 50 tons at £40,000 out of which 3 tons a year were exported. The amount of export will gradually increase.

A modern factory for candied fruit would be installed in affiliation to the Diamond Factory for Sweets at Ghamra, which is one of the best factories for this kind of production. A considerable amount of the production will be exported every year. The factory will benefit out of the residue by making jam, jelly, marmalade, syrup, stuffing for sweets according to the latest technical methods and conforming to the required specifications especially for export.

The estimated product of this factory is around 200 tons in the first year, liable to increase when necessary and in compliance with the demands.

## Utilization of Idle Capacity in E.B.O.T.'s Carbonated Beverages Factory:

Purpose of the Project:

The production of carbonated beverages is one of the oldest dustries in the country. It was carried out by manual machines in very mentary methods. Bottles of different shapes and sizes were used in filling. As a result the product was heterogenous in color, taste, ell and unhygenic due to the insufficient care in the cleanliness of the tles and preparation of the solutions. The production continued in that nner till the Second World War. Then many factories adopted the chanical methods. This industry played an important role in supplying Allied Forces and this helped them to develop and follow up the best chnical ways in production, e.g. the Coca Cola and Pepsi Cola Companies ich possess all the mechanical and techgical abilities besides their hly developed means of advertisement and distribution.

Consequently, many of the smaller factories, incapable to stand the petition of the bigger factories that could adopt the modern techniques, llapsed.

The productive capacity that can be utilized from the present ctories amounts to 360,000,000 bottles at 3,600,000 L.E. The actual oduction reached in 1958 is 350,000,000 bottles at L.E. 3,500,000.-

And since the Egyptian E.B.O.T. for carbonated beverages bought in 55, a piece of land at Ghamra to build a factory and stored the equipment t was imported in 1956 & 57 until the arrival of the rest, it was suggested t this idle capacity be utilized by completing one factory and using it in e nearest time possible.

The project was set on the basis of producing 7000 boxes 68,000 bottles) in a working day (3 shifts - 24 hrs). But since this industry seasonal, its production reaches its maximum during 3 months of the year ummar) and works moderately (two shifts a day) for two months and very little ne shift) for about five months. The full productive capacity of the factory ounts to 1,500,000 boxes, i.e. 36,000,000 bottles a year.

## II. CEREALS, CEREAL PRODUCTS AND GLUCOSE

### 1. Modernization & Improvement of Rice Mills:

The purpose of this project aims at the modernization of existing ice mills because they hull and whiten all the rice cultivated in the country. he average production of white rice in the last five years cost £ 25,000,000 a year, while the average consumption cost 15,000,000 L.E. a year. The average export of white rice and cargo was £ 12,000,000 for the same period.

All the rice mills were built by complete units imported tens of years ago, and most of them are in their way to decay. Due to the progress in the making of milling machines it is suggested that Egyptian factories be equipped with these machines to secure a good name for Egyptian rice in foreign markets. Rice-bran loses a big portion of its quantity and causes the decay of a big percentage of it, valued at more than one third of its quantity. The reason for this loss is the rancidity of its oil if it is not heat-treated. Thus it is suggested that the mills should include machines to dry the rice-bran before its extraction.

### 2. Dextrin, Solubles Starch, and Treated-Starch Production:

The purpose of this project is for the production of dextrin and the by-products of starch necessary for spinning, weaving and cement factories. The Southern Region imported in 1958 around 800 tons at £ 61,000 ; the Northern Region 600 tons at £ 50,000 besides the other by-products.

The project aims at the utilization of a part of the idle-capacity in starch factories and it is decided that a new unit be annexed to Sarpakis starch factory at Mostorod for the production of Dextrin and the by-products of starch.

## . Concentration of Corn Steeping Water :

The purpose of this project aims at the utilization of the corn-teeping water which contains proteins, carbohydrates, minerals, Phytic acid, itamin B. Its concentrated water can be used in the Antibiotics' industry, edicines, dried souse and animal feeding. The Sarpakis starch factory at storod have been chosen for this project because the corn-steeping water this factory (which contains about 7 % soluble solids) amounts to 100 tons day and this is wasted away. It can be used for the production of 1800 tons corn-steeping water a year containing about 50 % soluble solids. This oduct is much needed in European countries especially Switzerland and stern Germany.

## . Partial Replacement of Rice & Corn by Sweet-Potatoes in Starch Industry:

The purpose of the project aims at the replacement of rice and corn sweet-potatoes in starch industry. This will be replaced gradually in ten ars on condition that sweet potatoes are used for four months a year and rice corn the remaining months until the production of the required amount of eet potatoes is reached.

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## III. FRESH-PACKING AND FOOD PRESERVATION:

### . Six Citrus-Fruit Packing Houses:

Purpose of the Project : The sorting, grading, and packing of itrus fruits is one of the most recent industries in the Southern Region in pite of the good weather, abundance of fruit and their relative cheapness in omparison to similar products in other Mediterranean countries.

Two small packing houses are manufacturing now: one in the Tahrir rovince producing 15 tons of fruits in one shift and the other belongs to he Department of Horticulture, Ministry of Agriculture, producing 8 tons only n 8-hours shift. In addition, Exports' Development Organization has imported hree larger packing-houses: one which has already been built at Benha with productive capacity of 75 tons a shift, the second at Belbeis, and the third e at Assiut (each with a productive capacity of 50 tons/8 hrs). They will gin working at the present season.

But, due to the expected increase in the area of citrus orchards by ,000 feddans, and accordingly to the increase in exports of the product, the resent packing houses will be unable to meet local production or the expected crease. It is suggested that the six houses equipped with the most modern chines be erected especially in the Canal Zone and Sharkia Province each th a productive capacity of 100 tons (8 hours). As a result, we will be le to export around 50,000 tons of oranges of the different varieties, pecially Valencia, Navel, and Shamouti oranges.

. Six Fresh Vegetables' Packing Houses:

Purpose of the Project : This industry can be still onsidered and unknow in Egypt in spite of the high selling value of fresh egetables abroad. For example, the wholesale price of each single artichokes s 5 - 7.5 P.T. The kilo of green pepper is PT. 40.- of squash PT. 25-30, reen peas PT. 20-30, spinach PT. 40, cauliflower PT. 20, tomatoes PT. 5-30, ucumber PT. 30, strawberries PT. 75.- At present, vegetables intended r export are sorted and packed by hand. This results in the decay of most f the exports and thus spoiling our reputation abroad. Only one mechanical egetable packing house exists now at the Tahrir province with a productive apacity of 15 tons a shift. Therefore, it has been decided to erect six odern vegetable packing-houses for export purposes, each with a productive apacity of 2000 tons per season (from November till April of the following ear). They are suggested to be built in the areas that cultivate vegetables ntensively, i.e. at Qalioubia, Munufia, Giza, Beheira, Sharkia and Fayoum rovinces.

3. Peanuts & Peanut Products Factory:

Purpose of the Project : The five year plan of the Ministry of Agriculture includes the expansion of peanut cultivation to 50,000 feddans because it yields a good crop especially in sandy soils besides its any other agricultural benefits.

Thus the erection of a peanut products factory was included in the Second Five Year Plan of Industry. It is to be constructed in Sharkia Province with a productive capacity of 10,000 tons a year, out of which 5000 tons will be exported. The remainder will be shelled, thus yielding about 3500 tons of seeds, of which 2000 tons of the large fancy seeds will be fried, salted and vacuum-packed in tin cans. The other 1500 tons of seeds will be roasted and ground for utilization in other industries such as peanut-butter, etc.

## . Production of Sultana (Seedless) Raisins By Sun-Drying :

Purpose of the Project :          According to the report of the nistry of Agriculture, the grape's production in 1958 has reached 87,758 ns, most of which was consumed fresh. Very little was industrialized or ported. And since the country imports its needs of raisins, i.e. 2000 ns at 200,000 L.E., and since the experiments of sun-drying seedless- apes has succeeded, it was decided that such an industry should start in gypt, especially that it does not require any foreign currency to begin th. The sun drying method will take place locally, and 2400 acres of edless grapes will produce around 2000 tons of raisins per year.

## . Tuna Fish Cannery :

### Purpose of the Project:

The length of Egyptian coasts is almost 1500 miles besides the lakes, he Nile, Canals and drains. In spite of the fact that there are no accurate tatistics for the fish catch, its varieties and where they are most abundantly ound, the local fish catch (including shrimps) can be estimated at 140,000 ons a year: 60 % from the lakes, 15 % from the Nile and canals, and 25 % from he sea shores. The country still imports big quantities of canned, salted, oked and dried fish, which reach about 12,000 tons a year at L.E. 1,000,000 t of which 800 tons is canned tuna-fish at £ 166,000.-

It has been realised that tuna fish (of the Bonits type) abounds tside the Egyptian territorial water both in the Red Sea and Mediterranean; t another kind of fish is caught in the Red Sea and Suez Bay that can eplace the tuna-fish in canning (namely, Balamita and jack mackerel). he factory will begin canning imported frozen tuna fish until the local fish atch becomes sufficient to meet local consumption.

Suez has been chosen as the best place for this industry for several reasons: the existence of no fish-canning factories along the shore of the Red Sea and Suez bay, the abundance of fish in that area, and as an encouragement for fishery in the area.

The productive capacity of this factory would be 900 tons a year.

6. Smoked Silver-eels and Salted Sardines:

Purpose of the Project:

Smoking fish as an industry has not been introduced in Egypt; while the salting of fish is an old industry which is still carried out mannually. Some sardines - unfit for canning (but still fresh) - will be left out by the sardine and shrimp canning factory that will be installed in Ezbet el Borg at Damietta. These sardines can be salted, in addition to & apart of the sardines which are still being salted by elementary methods. Besides silver eels esist in abundance in the lakes especially the Manzala lake.

Therefore, it has been decided to install a unit for smoking silver-eels and salting sardines in affiliation to the canning factory at Ezbet el Borg, Damietta.

The productive capacity of the unit is estimated at 50 tons of silver eels and 500 tons of sardines per year.

7. Onion Pickling Factory :

Purpose of the Project : Most of our pickles are still done following old methods in stores, shops, and homes. Most of it is of a varied and poor quality. The First Five Year Plan of Industry has included the erection of a factory for dehydrating onions at Souhag: 10,000 tons of fresh onions will produce 1000 tons of dried onions. Considerable quantities of small onions will be unfit for drying. Their small size makes them more suitable for pickling. The pickled onions are widely desired in Europe. Thus, a unit for pickling small onions will be established according to the modern mechanical methods, and producing about 100 tons a year. It will be attached to the Onion Dehydration factory at Souhag.

8. Three Frozen Vegetables & Fruits' Factories:

The project of this industry has not been initiated in Egypt while it is one of the most popular industries in the world. It has excelled the canning industry because frozen foods keep their color, taste, odor and flavour to the extent that they can hardly be differentiated from fresh foods when cooked. Most countries of the world are trying to enlarge this industry. In Bulgary there are 10 such factories and it is trying to double this number in the coming two years. All the production of its factories is for export.

Our country is in no way less capable of initiating this industry, especially after the erection of the two big freezers included in the Ist Five Year Plan: in Cairo and Alexandria, for storing frozen fish and meat. Each of them could store 1500 tons and contains a room for quick-freezing. Thus they can be more benefitially used by constructing three factories for the preparation and packing of vegetables and fruits prior to freezing and storing in them.

9. Shark Liver-Oil and Fishmeal:

Purpose of the Project: Sharks exist in abundance in the Red Sea. The shark's liver consist about 17.5 % of the total body weight. It is rich in oil that amounts to about 46 % of it. This oil is rich in Vitamin A & D; and because its value is thrice the value of these two vitamins in the cod-liver oil, it is suggested that a factory for the extraction of shark liver oil be erected in Ghardaka with a productive capacity of 430 tons a year and for drying and grinding its residue thus producing from it 750 tons of powder (fishmeal) fit for poultry and cattle feeding, and salting and sun-drying about 24,000 shark-skins, for export. The skin is tanned and used in some leather industries.

The produced crude oil will be purified in a special unit for that purpose attached to one of the local medical companies. Two tons of pure oil are produced out of the three tons of crude oil.

10. Extension in Edfina Cannery to Produce Concentrated Fruit-Juices & Fruit-butters :

This project is for fruit juices which are produced now in Egypt at Edfina and Kaha canneries, but the concentrated juice was not produced except in Edfina cannery this year. In very little quantities e.g. about 12 tons of orange concentrated juice, in spite of the abundance of fresh fruit suitable for this purpose such as oranges, lemons, tangerines, mangoes, strawberries, apricots. Thus for the production of carbonated beverages great quantities of orange & lemon concentrated juice with their paste and oil was imported till they reached in 1959 around 234 tons at 160,000 L.E.

The Edfina Factory at Alexandria will be enlarged by increasing its production of fruit juice and paste to 500 tons a year.

11. Cold Stores & Freezers :

Purpose of the Project :

There are 40 cold stores in the country whose area is 98,000 cubic metres able to store about 32,000 tons of different foods.

For the First Five Year Plan, it was decided that another 18 cold stores be erected, 3 in each of Cairo, Alexandria and Suez. They would be sufficiently wide to freeze and store 1500 tons of exported and local meat and fish. One cold store would be installed at Aswan for 200 tons half of it for storing frozen meat and the other half for storing fresh fruit and vegetables, 14 cold stores in the capitals of the other provinces each capable of holding 100 tons - one half for storing frozen meat and the other half for storing fresh fruit, vegetables, etc. Agreements for the erection of these stores were made and they will be completed in the middle of 1961.

For storing the summer potatoes necessary for local consumption during the months of July - December, a freezer that can hold 50,000 tons is needed, for storing pears one of 10,000 tons during the months of August - November. This means that after executing the 1st five years plan of Industry, the country will still need additional cold stores of 60,000 tons capacity for storing fresh pears and potatoes.

These new cold stores could be utilized during the period from November - April to hold about 50,000 tons of citrus fruits which are intended for export and an equal quantity of fresh vegetables with the aim of varying our exports and not depend on the export of one crop, meaningly cotton. As to the frozen meat freezers will be abundant after the execution of 1st five year plan. But, there will still be a need for other freezers in the fishing areas especially with the new policy for the expansion in fishing, and the aid of the cooperative and Agricultural Credit Bank to fishermen cooperatives and owners of fishing boats to facilitate the improvement of their fishing means: boats, nets, and equipments for the discovery of fish gatherings. A big increase in fishing will be expected.

Therefore, it is suggested that more cold stores, with a capacity of 12,000 tons, should be constructed out of which 11,000 tons of it should have a temperature of $0^{\circ}$ + 5 °C and a relative humidity of from 58 - 90 %, for storing fresh vegetables, fruit, and dairy products, and 1000 tons with a temperature of 17 °C. for freezing and storing fish.

Cold stores for fresh vegetables fruit, and dairy products would be installed at Kafr El Dawar, Abou Homos, Kom Hamada or Kafr el Zayat, Talkha, Ashmoun, Menouf and Badrashein.

Fish freezers would be constructed at Rosetta , Borollos, Sidi Salem, Damietta, Mataria (Damietta), Ghardaka, Koseir.

## IV. EDIBLE OIL AND ESSENTIAL OIL INDUSTRIES.

### 1. New Cottonseed Stores:

This project aims at saving the oil which decomposes and undergoes chemical hydrolysis in the cottonseed during its faulty storage and extraction and gaining it as an oil and not as a minor product. It aims at controlling the percentage of the free fatty acids in the seed and keeping it at a low level which will cause a low percentage of waste during the process of purification, and a rise in the average amount of oil produced. This project saves a large number of jute-sacks in which the seed is now packed and stored in the open-air exposed to all weather changes that destroy many of its properties.

### 2. Cottonseed Decortication before Pressing for Oil Production :

This project is aimed at minimizing the loss of oil in the press-cake. For it has been found that the quantity of oil left in the undecorticated cottonseed press-cake produced from one Ardeb of seeds is about 4.6 kilos, while the amount of oil found in decorticated cottonseed cake and hulls resulting from one Ardeb of seeds amounts to 3.2 kilos. Therefore, the amount of oil saved by decorticating one Ardeb of seeds is around 1.4 kilo and the estimated total savings are 7000 tons whose price according to international markets is L.E. 980,000.-

### 3. Refining Oil by Centrifuge :

The project aims at refining oil by centrifuge instead of refining it in tanks. The percentage of waste will drop from 8.5 % down to 6 %. Accordingly, 3000 tons of purified oil will be saved each year whose total price according to international prices is 420,000 L.E. This project is one of the principal projects aimed at increasing of the local production of oil to meet consumption needs and cover the shortage because cottonseeds is the main source of oil for consumption in the whole country.

## 4. Two Rice-Bran Oil Factories :

The project aims at the bran resulting from hulling and whitening rice forms about 6-8.75 % of the whole rice. This rice-bran contains 12-14 % oil that should be economically utilized. This project aims at extracting crude oil from it for soap industry or for human consumption after refining it.

Two new rice-bran oil factories will be installed besides the two mentioned in the 1st Five Year Plan: one to be built in Damanhour, the other in Tanta because these cities are in the rice cultivated lands and where most rice mills exist.

The productive capacity of each one is around 15,000 tons of bran a year producing 1500 tons crude oil to 13,000 tons bran usable as animal-feed for its high nutritive value and the possibility of storing it for long periods without decay (the oil left in the bran used to rancid when it was stored without extracting it).

## 5. Extraction and Refining of Castor Oil :

The project aims at the extraction and purification of castor oil is one of the arising unsystematized industries in the Southern Region. The castor plants are not widely planted but occur in scattered areas. Castor cultivated land amounts to 750 feddans a year. Its plantation is successful in Arish, Sinai, Natroun valley and Tahrir province. Each feddan of castor which is well irrigated and fertilized yields about 500 - 750 kilograms. The seeds of annual variety of castor contain about 46 % oil and the perennial variety contains about 51 % oil.

Besides using castor oil in pharmacology, it is included in many other industries such as printing ink, weaving, dying, polishes, myl plastics, soaps, artificial leather and other polishes and varnishes after the chemical removal of water from the oil. It is also useful as an insulator for wires and electric machines, in explosives and in lubrication of jet-planes.

The average local production of castor oil is 150 tons a year and the local consumption is 500 tons of pure castor oil, 100 tons of sulphonated castor that goes into the weaving industries and tanning of skin. Egypt imported in 1958, 392 tons of pure castor oil and 100 tons sulphonated castor oil. But the use of castor oil will increase in the coming years due to its increasing demands in the mentioned industries.

A factory would be installed with the productive capacity of 2000 tons of dry seeds gathered from the cultivation of about 4000 acres in Tahrir Province or Wadi el Natroun (preferrably for the perennial variety for the high percentage of oil it possesses).

It must be noted that the castor seeds should hot be pressed in the ordinary mills that produce ordinary food oil because of the poisonous substances it contains.

6. Agricultural & Industrial Peanuts Company:

Purpose of the Project: The local consumption of plant oils increases year after year due to the continuous increase of population and of individual consumption.

The shortage in local production of oils, fats, and their by-products is estimated now at 70,000 tons which will increase up to 96,000 tons in 1965. This should be avoided by planting more oil yielding crops ( the most important is peanuts ) and utilising the present oil resources.

It was suggested that the plantation of peanuts be expanded to utilize its fruit in the production of oil and press-cake. Peanut was chosen for several reasons :

1. It is planted in sandy soil, thus not replacing the main crops of the country such as cotton, wheat, maize, etc.....
2. Peanut is a land-improving crop. It enriches the soil by the nitrogen produced by the Azoto-bacter in its roots left in the soil.
3. It is rich in oil and proteins. The percentage of oil in some of its kinds reaches 49 % after shelling it. This helps in raising the profit from its cultivation and pressing.

4. The feddan yields about 1300 kilos of peanuts i.e. 380 kilos oil, 580 kilos of decorticated cake, and 320 kilos shells.

5. Areas cultivated with peanuts can be used after several years in the cultivation of other crops.

It was decided that an agricultural & industrial Company be organized in which some or all the existing oil companies participate to execute this project. It will start by cultivating 30,000 acres in 5 years on the basis that this is the largest area that can be cultivated during that period. Cultivation will expand gradually in the following years.

This area will be limited to the land between Beni Mazar & Mellawi for the abundance of water and trained farmers in that area, in which Samalout alone cultivated more than 4000 acres; the crop of 30,000 acres is about 39,000 tons of peanuts that can produce 11,000 tons of oil, 17,000 shelled press-cake 10,000 tons of shells. The produced press-cake is considered a highly nutritive food used in the production of many sweets and biscuits. From its protein artificial fibers can be produced. The peanut-shells can be used in animal-feed besides using them in the rubber-industry as insulators.

## 7. Geranium Oil Extraction Factory :

Purpose of the Project: The plantation of medical and aromatic plants and their industrialization in Egypt is an arising project. They do not meet local demands. The cost of such imported plants in Egypt reached £ 1,000,000.-

But, since Geranium oil is considered one of the most important and essential oils used in the production of perfumes and sweets, and since we cultivate about 500 acres only of its plants yielding around 10,000 kilos at 120,000 L.E. according to the export prices in 1959, it is suggested that the cultivation of Geranium be expanded by planting another 300 acres in the land of "Misr Company of Orchards and Vineyards" at Nobaria. This Company cultivates now 200 feddans of geranium. A new unit will be installed to extract aromatic oils from the crop that amounts to 10 tons for every acre. The productive capacity for the extracting unit after expansion will be 5000 tons of geranium plants a year. It will be run 200 days a year and all its product will be for export.

## V. DAIRY INDUSTRY

1. Milk Pooling Centres:

This project aims at supplying the dairy factories in the First & Second Five Year Plans with clean, cool milk. The installation of such factories require the existence of centres for pooling and cooling the milk in the producing areas.

The project aims at the increase of milk by creating a permanent systematic market for it (through these centres) and on which the milk-seller will depend. This will encourage the milk producer to increase his production of milk through the increase of the number of cattle or the improvement of their breed. Consequently, the animal wealth of the Nation will increase.

Sixty Pooling centres will be erected with the productive capacity of 109,500 tons of milk a year (5 tons a day each centre).

This number was calculated on the basis that 15 units will supply sufficient milk for the 3 dairy factories included in the first Five Year Plan. Twenty for the milk factory at Damietta which is suggested in IInd Five Year Plan; 5 centres for the 2 milk sterilizing factories suggested in the IInd Five Year Plan; 20 centres for the four dairy factories suggested in the Second Five Year Plan.

## 2. Dairy Factory at Damietta :

This project aims at the erection of a cooperative factory at Damietta with the object of converting the unhealthy industrialization of milk to a modern systematized industry and supplying that zone with pasteurized milk and its products.

The productive capacity is 100 tons of fresh milk daily, producing every year 17,400 tons pasterized milk, 2150 tons cream cheese (soft), 540 tons Edam cheese (hard), 1095 tons butter, 1280 tons Yoghurt.

The product of this project is intended for local consumption and the export of butter at £ 438,000.-

## 3. Four Dairy Factories:

This project aims at spreading the modern dairy factories all over the country, and thereby increasing the consumption of posteurized milk and the improvement of dairy products. Milk production will increase when the producer finds a stable systematized market for the consumption of his milk for industralization. It also aims at ceasing the import of some dairy products such as hard cheese and butter, and the export of the excess, e.g. butter.

The installation of these 4 factories will complete the milk industrialization plan. Their erection will begin after building and running the three factories of the First Five Year Plan that will start running in 1962. The place of erection will be decided according to the result of the new experiences.

The productive capacity of the four factories is 100 tons of fresh milk a day that give : 17,400 tons pasteurized milk, 2150 tons cream cheese, 540 Edam cheese (hard), 1095 tons butter, 1280 tons Yughurt.

The product of the four factories will suffice local consumption. But all the butter will be exported at L.E. 438,000.-

### . Two Experimental Milk Sterilizing Plants:

These two plants will be two experimental units attached to both e S.I.C.L.A.M. Company at Alexandria, and the Misr Milk & Food Factory at iro, with the object of finding out how good Egyptian milk is for complete erilization, and the quantity of its local consumption. If the experiment cceeds, the industry will be expanded because sterilized milk stays a long e without spoiling and does not need keeping in the refrigerator.

The quantity of milk produced will depend on the capacity of the panies and the demand for it.

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## 5. ENGINEERING INDUSTRIES

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### I. MANUFACTURE OF EQUIPMENT FOR ROAD TRANSPORT, RAILWAYS & AGRICULTURAL TRACTORS:

1. Manufacture of Passenger Cars
2. Manufacture of Heavy Trucks
3. Manufacture of Diesel Engines
4. Manufacture of Diesel Engines & Machining of Gears
5. Manufacture of Agricultural Tractors
6. Manufacture of Railway Passenger Wagons

### II. MANUFACTURE OF EQUIPMENT FOR MARITIME TRANSPORT:

1. The Shipyard at Port-Fouad

### II. THE MANUFACTURE OF ELECTRICAL & ELECTRONIC EQUIPMENT:

1. Manufacture of Electric Motors and Fans
2. Production of Electric Accessories for Automotive Industry
3. Extension for the "Electric & General Contracting Engineering Co." Factory
4. Complementary Products to the "Electro Cable Egypt Co."
5. Manufacture of Florescent Lamps

### V. PUMPS INDUSTRY:

1. Production of Pumps

### . SPARE PARTS INDUSTRIES:

1. Production of Spare Parts for Textile Industry
2. " Petroleum Spare Parts
3. " Spare Parts for Railways
4. " " " " Cars & Tractors.

## VI. MISCELLANEOUS SMALL ENGINEERING INDUSTRIES:

1. Training Rifles
2. Guarding Rifles
3. Air Shooting Rifles
4. Typewriters
5. Calculating Machines
6. Semi-Automatic Weighing Machines
7. Ball Bearings
8. Petrol Pumps for Service Stations
9. Sailing Planes
10. Mechanical Children Toys
11. Metal Nets
12. Domestic & Industrial Electric Articles
13. Hand Watches
14. Medical & Sun Eye-Glasses' Frames
15. Metal Artificial Jewellery
16. Steel Scaffoldings & Sheets for Concrete Constructions
17. Milk Containers
18. Artificial Limbs

## VII. WOOD INDUSTRIES:

1. Imprignation of Wood
2. Wood Sawing, Drying & Seasoning
3. Production of Plywood
4. Production of Packing Cases

## I. MANUFACTURE OF EQUIPMENT FOR ROAD TRANSPORT, RAILWAYS & AGRICULTURAL TRACTORS

### . Manufacture of Passenger Cars:

### Aim of the Project:

It is possible to classify passenger cars according to sizes into :

Small cars, with an engine capacity varying between 500 & 1500 c.c.

Medium cars, with an engine capacity varying between 1500 & 2500 c.c.

Large cars with an engine capacity exceeding 2500 c.c.

The following table shows the number of all sizes of passenger cars imported over the last few years :

| Year | No. of Cars Imported | Price in L.E. |
|---|---|---|
| 1952 | 4575 | 2,491,586 |
| 1953 | 2044 | 1,008,560 |
| 1954 | 3131 | 1,577,326 |
| 1955 | 5722 | 3,269,563 |
| 1956 | 1913 | 1,860,973 |
| 1957 | 1049 | 631,957 |
| 1958 | 3174 | 1,477,962 |

It should be noted that the number of cars has decreased in the last few years because of importation difficulties which have occurred as well as restrictions enforced upon the importation of passenger cars during that period. If we consider the year 1955 (during which the conditions were normal) as a measure to estimate the country's need of imported cars, it will be seen that the volume has reached about 6,000 cars.

On the other hand, the National Production Council in 1956, studied the country's need for passenger cars. According to the reports received the estimated proportion of persons per car are as follows :

Year 1955 one car per 295 persons.

Year 1960 the proportion decreases due to the absorption of income by the economical projects.

Year 1965 one car per 295 persons, same as year 1955, as a result of some of the current economical projects beginning to bear fruit.

Year 1975 one car to every 280 persons resulting from the increase of income due to economical projects.

Assuming the life of a car to be 10 years, the required capacity of the proposed factory in this case is estimated as follows :

| Year | Population of Region in million | Proposed Number of Persons per Car | Number of Cars which should be available | Production needed to meet the consumption | Proposed Production |
|---|---|---|---|---|---|
| 1955 | 21,9 | 295 | 71887 | 7188 | 3000 |
| 1965 | 28,0 | 295 | 94900 | 9490 | 6000 |
| 1975 | 35,0 | 280 | 125000 | 12500 | 12000 |

It is to be noted that the proposed production in the period of 1955 to 1965 is less than that which should be produced to meet the consumers need. Because, as has been mentioned previously, it is expected that the economical projects would absorb capital. But the proportion is higher and closer to the consumption in 1972, as it is expected that the standard of individual income will rise, owing to the colossal projects which will be completed and bear fruit by 1972. Taking into consideration the number of imported cars in the last few years, it is possible to estimate the local consumption at 6,000 cars of different types.

It is necessary, however, until the passenger car industry with its feeding industries are established, to unify the proposed product and concentrate on one or two types at most. Owing to the economical consumption and low running expenses of small cars, plus easy manoeuverability which make them so popular, it is proposed to concentrate on manufacturing such cars and to produce a small car fitted with a four cylinder petrol engine with a capacity of 1 to 1.5 litres.

The price of such a car is estimated as delivered to Alexandria port at about L.E. 400 to 450, but the consumers pay owing to exchange rates and customs duty about 3 times as much, that is between L.E. 1,200 and L.E. 1,500.

It is expected after producing such cars locally that the sale rice will drop to about half and that, as a result, the demand will turally increase. It is foreseen that the export market for these small rs will be very limited owing to strong foreign competition, on the one nd and on the other hand to the preference of the Arab countries for big rs, as local conditions there demand heavier cars. Therefore, it is dvisable that the production of the proposed factory should conform with e actual demand taking into consideration the expected increase in the cal demand, and the limited expert market in the Northern Region and ab countries.

Considering the above factors it is clear that it is possible to t up a factory which would produce 10,000 small cars annually.

As this proposed out put is not considered justifiably onomical to stard a complete factory, because such a factory would quire a production capacity of not less than 25,000 cars annually, is necessary to base this proposed manufacture on the local feeding dustries to limit the production of the factory itself to parts which not require large equipments. Thus the economics of the project will prove while making it possible to meet the fast development of car dustry providing that these feeder industries are strengthened and eeded up.

Following is a list of proposed parts to be made by the local ctories and feeder industries.

For Chassis: Tyres, batteries, sheet glass, wires and cables af springs, brake lining, exhaust pipes and mufflers, fuel tanks, bumpers, neral parts (bolts and nuts), rubber and plastic articles, brass piping d sections, upholstry materials, bulbs, paints, brake drums. All these rts are produced locally in existing factories or factories which are ready erected in accordance with the first five year plan.

In addition it is expected that the production of the following parts should commence shortly, most of which are included in the first five year plan :

For Chassis : Shock absorbers, coil springs, screen wipers, speedometers, horns, lubricating and greasing oils, clutch discs.

For Engine: Spark plugs, electrical fittings, gaskets, pistons, piston rings, valves, bearing bushings, oil, water and fuel pumps, belts, air and oil filters.

It is possible for military factory No.9 and other local foundries to undertake the production of the necessary castings while the forging factory (one of the projects of the first five year plan) and already on contract can undertake the necessary forgings.

As for the sheet stampings, it is necessary to postpone the product of main body parts to avoid the great cost of presses and their necessary dies, also to ensure the development of the car body to keep up with new international models. It is possible to make the simple stampings in the local factories. The necessary gears can be made in the present truck factory, which is being executed in the first five year plan, and this necessitates the reinforcement of this department of the factory and the increase of some of its equipment.

Thus the operations that are to be completed in the proposed factory may be restricted within the narrow limits specified below :

For Chassis : The machining of some castings, for example, gear boxes, clutch housing, steering gear box, brake drums, spring shackles etc.

The machining of some forgings, for example: Front and rear axle parts, parts of steering mechanism, pedals, etc....

The pressing of some parts for example: parts of chassis, simple body tarts.

For Engine: The machining of engine block and cylinder head, connecting rod and crank shaft, camshaft, and other engine parts whether cast or forged, manufacturing other parts from different raw materials, assembling of engine, painting, adjusting, testing and mounting of the engine. Then follows welding of carriage body onto the frame, assembling it onto the chassis, then the upholstrey and internal finish of the car, painting, testing and adjusting.

The main parts of the body will continue to be imported already shaped and prepared for welding, and some electrical fittings and instruments and other parts that are not easily locally manufactured economically for the time being. In this way, it will be possible to complete the production of passenger cars on a sound economical basis guaranteeing production at a reasonable price. It is possible to estimate the proportion of parts to be produced in the car factory at about 30 % of the complete car value.

Suggested Output:

It is suggested that small passenger cars be produced with petrol engines of 1000 to 1500 c.c. with an output of 10,000 cars per annum on the working basis of two shifts, and also the necessary spare parts to be manufactured in the limits of 15 per cent of the parts made in the factory. The value of the production within the factory is estimated approximately at 30 percent of the full value of the car.

The value of the factory's production is estimated at approximately L.E. 7,500,000 per annum.

## 2. Manufacture of Heavy Trucks:

### The aim of the project:

At the beginning of the execution of the truck project in the first five year plan, it was decided to commence with the production of one kind of road transport car, of 5 ton capacity for civilian use and 3-ton capacity for military or cross country services, with a production of 3500 civil and military trucks and 500 extra Diesel engines, of 6 cylinders 112/125 H.P. It was taken into consideration, at the undertaking of this project, the possibility of increasing the production to 6000 civil and military trucks, and 2000 Diesel Engines.

On studying the local market it was ascertained that there was a vital demand for heavier loads besides those trucks that will be produced, and it was estimated that the annual demand would be 2000 trucks of 10 to 12 tons.

The number of trucks produced will be sufficient to cover the demands of the Southern and Northern Regions, especially as most of the Northern Region demands are for heavier trucks, and it is generally believed that these trucks, towards the manufacture of which there is an international trend, will be the basis of the expected expansion of the road transport industry.

### Suggested Output:

This project will be undertaken as an expansion of the existing trucks factory and will entail the production of 2000 Diesel trucks per annum of 10 to 12 ton capacity on a two shift basis. By increasing the equipment of some departments of the existing trucks factory, it will be possible to produce most of the parts of the heavy trucks, which it is proposed to manufacture, except for the frame beams and some other parts which differ basically from those of the present trucks. As regards the engine and gears for transmission and steering, they will be provided for in a separate project to expand the existing truck factory. The proportion of production value in this project is estimated at approximately 40 % of the complete truck value, while the estimated production of the factory is approximately L.E. 8,240,000 per annum.

## 3. Manufacture of Diesel Engines:

### The Aim of the Project:

The execution of the project for producing horizontal diesel engines is now being carried out (part of the first five year plan) with small powers of 6 to 26 horse power and a speed varying between 600 and 1,300 R.P.M. This for fixed services and especially for agricultural and irrigation purposes, and that with an output of approximately 1000 engines per annum.

The execution of the project for the truck industry has commenced (part of the first five year plan) and consists of the production of 4,000 Diesel engines of 6 cylinders, producing 112 to 125 horse power at 2,300 R.P.M.

The following table shows the figures for the import of fixed Diesel engines especially used for land and maritime transport in the Southern Region :

| Power | 1955 | 1956 | 1957 |
|---|---|---|---|
| Upto 6 H.P. | 638 | 425 | 265 |
| " 6/12 H.P. | 1339 | 696 | 740 |
| " 12/20 " | 320 | 510 | 337 |
| " 20/50 " | 509 | 361 | 315 |
| Total : | 2806 | 1992 | 1657 |

If we consider the import difficulties in the last few years, which brought about the decrease in numbers of imported engines, and if we consider the year 1955 normal for imports, then it may be estimated that the import of engines in that year is evaluated at approximately 2,800 engines, upto 50 H.P.

It is expected that the country's need for these engines will ncrease with the present industrial revival, in view of the wide dustrial scope where in these engines may be used. We may estimate e present demand at approximately 3500 engines per annum of the above ntioned power, and considering the project which is already on contract r execution and which is to produce 1000 engines per annum, and taking to account the expected expansion in the use of these engines we may, erefore, estimate the number of engines required to be produced at proximately 3000 engines of 6 to 50 H.P.

Considering, therefore, the local market demands for substitute gines for the road transport cars already in use, and which are estimated approximately 30,000 trucks of varied loads, and revising the conditions ter the production of Deutz truck of 5-ton capacity in the trucks factory rt of the first five year plan) it is clear that it is necessary to duce not less than 2000 engines per annum, of 80 to 100 H.P. in order supply the demand for trucks of other loads and types.

**gested Output:**

Considering the above, it was decided to erect a factory for the duction of engines of flexible design to allow for the production of ltiples of the unit of one cylinder covering the need for local demand the capacities already referred to and produced locally.

The production output of the suggested factory will be 5000 gines per annum on the basis of two working shifts distributed as llows :

| | | | | |
|---|---|---|---|---|
| Engine | 1 Cylinder | of approx. | 12 H.P. | 1500 Engines |
| " | 2 " | " | 20 " | 750 " |
| " | 3 " | " | 40/50 " | 750 " |
| " | 4 " | " | 80/100 " | 2000 " |
| (Replacement for lorries) | | | | |
| | | | Total : | 5000 Engines per annum |

As the engines of small capacity used for industrial purposes, usually worked at a medium speed not more than 1500 R.P.M. and as it is not advisable to use gear boxes or transmission belts, the main type of engine is worked by Diesel.

Many factories may be found producing the multiple of a single cylinder with interchangeable parts, and working at two speeds; medium speed for fixed use or in factories (1500 rpm) and high speed (2200/2800 rpm) for use by means of transport, and this is considered the best solution for such engines.

In this way it is possible to cover the country's needs for the various types of engines including the substituted engines for the present road transport vehicles, although it does not cover the need for the heavy trucks, or the agricultural tractors, or the passenger cars which need a petrol engine and which is suitable for the car of which the local production will be decided upon. .

The factory will depend on the local feeding factories to guarantee the supply of many of the engine parts such as castings, forgings, forged parts, gaskets, pistons, piston rings, liners, all of which are included in the first five year plan. It will depend also on the import of certain parts such as: roller bearings, fuel pumps, and injectors until they can be produced locally on an economical basis.

The operations inside the factory will be restricted to the machining of the castings, the forgings, and some other parts, then their assembly, painting and testing. It is possible to estimate the proportion of the value of production in the factory at approximately 25 per cent of the value of a 4-cylinder engine, reducing to approximately 20 % for the one cylinder engine. Thus the average proportion for manufacturing is 22.5 % of the value of the complete engine. The factory will also produce the necessary spare parts for its production. Thus we may be able to estimate the value of production in the factory at approximately 2,200,000 pounds per annum.

## . Manufacture of Diesel Engines & Machining of Gears. (Expansion of the present local Trucks Factory)

### The Aim of the Project:

Equipment for the department producing engines and gears have een contracted for, as part of the project for the manufacturing of truck mongst the first five year plan) and reckoned at 4000 engines per annum n two shifts, with their necessary spare parts, and the necessary gears ith their necessary spare parts, for 3500 trucks per annum.

As the second five year plan includes the following projects :

A) The expansion of trucks production by producing 2000 trucks of capacity 10 to 12 tons per annum.

B) Production of 2700 agricultural tractors per annum.

C) Production of 10,000 passenger cars per annum.

It was, therefore, proposed to expand the present truck engine duction unit, with an increase based on the number of heavy Trucks equired, being 2000 engines per annum (Project A).

Also the expansion of gear production, with addition of fficient equipment to cover the needs of projects A, B and C and stimated at approximately 1000 tons per annum.

The production value of the project is estimated at 1,800,00 unds per annum.

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## 5. MANUFACTURE OF AGRICULTURAL TRACTORS:

### AIM OF THE PROJECT :

The agricultural tractors that are now in use in the Southern Region vary in power between 25 to 45 H.P. and over.

Although the power of tractors in common use in the Southern Region varies between 25 to 35 H.P., the present general trend is towards the use of the tractor with a power varying between an average of 40 to 50 H.P. and, this being in accordance with what has been proved to be the most suitable for the Egyptian soil, the experts have unanimously agreed that this is the most suitable power for the proposed local production.

As for the type of engine and the fuel to be used, although the normal trend these days is towards the use of Diesel engines, yet taking into account the abundance of local petrol production, we must consider the use of petrol engines when taking the final necessary steps in the execution of the project, keeping in mind what has already been mentioned about reducing the price of petrol to ensure economical operation.

With regard to method of traction, there are two basic types of tractors :-

First : Those provided with iron wheels, or wheels covered with rubber tyres.

Second : Those running on tracks.

The first method is most used in the case of small and medium sized tractors. It was, therefore, decided that the proposed locally produced tractors should be of the type run on wheels, as it is customary to use the track for the big tractors of power exceeding that proposed for production locally.

### Normal Requirements for Replacement of Tractors in the Southern Region:

According to the census of 1955, the number of tractors in the Southern Region was 10,750 while it increased to 13,000 in 1957.

The following table shows the number of tractors imported uring the years 1952 to 1957 :

| 1952 | 1953 | 1954 | 1955 | 1956 | 1957 |
|---|---|---|---|---|---|
| 1,502 | 459 | 1,030 | 1,033 | 822 | 414 |

From the table, it is obvious that with the exception of 1957, he average number of tractors imported annually could be considered about 000. This figure is expected to cover the normal depreciation of the mber available in the Region, which is about 13,000 tractors, on the ssumption that the average life of the tractor is 10 to 12 years.

Therefore, the number of tractors of 40 to 50 H.P. that should produced annually to meet the normal needs of the Southern Region is 00.

## quirements for the Project of Agricultural chanisation in the Southern Region:

Studies undertaken by the Ministry of Agriculture for agricultural chanisation in general, replacing animal power in ploughing, threshing, lling, and the like, show that this project will need 22,000 tractors to rve areas each of which is more than five acres, and classified as follows :

| | | |
|---|---|---|
| 1,000 | Tractors of more than | 55 H.P. each. |
| 13,000 | " | 45 H.P. each |
| 8,000 | " | about 30 H.P. each |

The cost of these tractors is estimated at L.E. 35,000,000. is estimated that a period of 10 years is required to obtain this number tractors to complete the mechanisation of agriculture in the Southern gion.

The number of tractors in good operating condition at present does t exceed half that. Once a decision is taken to start the project, it will necessary to double the existing number in the Southern Region, in the riod assigned for the execution, in addition to producing the necessary ctors to compensate for the normal annual depreciation.

It is, therefore, clear that the annual number required for the Southern Region, assuming the immediate start of the agricultural mechanisation project, is 2000 tractors. On the other hand, if this project of agricultural mechanisation is delayed, the tractor project should be based on 1,500 tractors on a one-shift production basis, to be increased to 2,700 o, twp sjofts, to meet the increase due to the commencement of the mechanisation project and also to cope with the needs of the Northern Region, as will be shown later.

## Expected Needs Resulting from the Execution of the High Dam Project:

Information from the Agrarian Reform Authority indicates that the tractors which will be used to reclaim the land resulting from the execution of the High Dam Project, will be of the large type tractors (Bulldozers), the number of which needed in the next 10 years, viz: 1961 to 1970, is 2,070 Bulldozers, with power ranging from 45 to 150 H.P.

As these tractors are large, and differ from tractors used for normal agricultural purposes, and the annual demand is limited, it is not advisable to have them produced locally.

After this period, however, the reclaimed land will require a number of other agricultural tractors of the normal type which could be estimated at 4,000 tractors. Such being the case then at the end of this period, consideration may be given to doubling the output of the factory proposed to be built at present.

## Requirements resulting from the Execution of the New Valley Project:

It is estimated that one million feddans will be reclaimed after the execution of this project. For reclaiming and cultivating this area, 4000 tractors are needed at the rate of one tractor per 250 feddans.

This being in the second stage, and similar to the aforementioned consideration it could be postponed for the time being.

Requirements of the Northern Region:

There are now 2,500 agricultural tractors in use in the Northern Region. If we consider the yearly depreciation at 10 %, we find that the annual needs to keep this figure constant, would be approximately 250 tractors.

Imports of agricultural tractors by the Northern Region from 1955 to 1957 are estimated as follows : weight being given in tons and the value in thousands of liras :

| Year | 1955 | 1956 | 1957 |
|---|---|---|---|
| Weight Tons | 3,610 | 3,434 | 1,791 |
| Value : 1000 Liras | 8,597 | 4,569 | 5,252 |

Estimating the price of the tractor at 10,000 Liras that is approximately L.E. 1,000, it can be deduced that the number of imported tractors in the years mentioned above are 860, 457 and 525 tractors respectively.

The annual needs of the Northern Region can be estimated at 300 to 400 tractors per annum with a possible increase to 600 per annum following on agricultural expansion in this Region.

Suggested Output:

Considering the above, it is clear that the country is much in need to erect a factory for the production of agricultural tractors of 40-50 H.P. with an annual output of 1500 tractors per one shift, and to be increased to 2700 tractors working 2 shifts to fulfil the expected increasing demand in the coming years.

The factory will depend on the local factories to deliver the required castings, forgings and other parts as leaf springs, pistons, liners, gaskets, rubber parts, etc....., also the gears which will be manufactured as an extension to the gears section included in the existing trucks factory, the front and rear tyres expected to be manufactured locally.

The factory will import some parts the local production of which is difficult and uneconomical.

The operations inside the factory will be restricted to the machining of the semi-finished raw materials, and some parts from their raw materials, then assembling the tractor, painting and testing. It is possible to estimate the proportion of the value of production in the factory at approximately 35 % of the total value of the tractor.

The total value of the production of the factory is estimated at approximately L.E. 2,835,000 per annum.

6. Manufactor of Railway Passenger Wagons:

Aim of the Project:

It is estimated that the number of Railway Passenger Wagons to be replaced annually is 50. This number justifies the manufacture of these wagons locally, providing it is attached to the railway goods wagons factory at Helwan (SIMAF) and thus completing it. The factory then can produce Diesel busses if needed in future, providing engines and some gear parts are imported.

The factory will mainly depend on local factories for the supply of some moulded and forged parts and interior wagon finishing.

It will depend on importation, however, of some other parts. Work within the factory itself is limited to cutting and shaping beams and plates, welding and assembling of the wagon

Suggested Output:

The production of 50 passenger wagons per annum working at one shift.

The estimated output value of the project is of about one million pounds annually.

ebm.

## II. MANUFACTURE OF EQUIPMENT FOR MARITIME TRANSPORT

### 1. The Shipyard at Port Fouad:

Aim of the Project:

This project has already been studied and is being supervised by the Suez Canal authority.

This shipyard depends on the present possible activities offered y the authority's workshops at Port Fouad. The aim of the project is to rect a shipyard at Port Fouad for building ships of 3,000, 6,000 & 12,000 ons with a maximum output of 48,000 tons annually, the value of which is stimated approximately at L.E. 4,320,000. This is in addition to articipating in building some maritime units. The number of which the Suez anal would need is 6,000 tons per year.

The first phase of the project has been completed, that is, the uilding of ships of 3,000 tons.

It has been decided to include this project in the Second Five Year dustrial Plan, so as the remaining last stages are to be carried out for ilding ships of 6,000 and 12,000 tons.

## III. THE MANUFACTURE OF ELECTRICAL AND ELECTRONIC EQUIPMENT

### MANUFACTURE OF ELECTRIC MOTORS AND FANS

Aim of the Project:

The country imports electrical motors either singly or amongst chinery and equipment. It is deduced from the complete study of the year 56 that the number of motors with a capacity of less than 1 H.P., amounts approximately 10,000 motors, and that the number of motors of a capacity ying between 1 to 10 H.P. amounts also to approximately 10,000 motors. for the motors with a higher capacity their number does not exceed 1500 tors. An increase is expected in these quantities in accordance with the dustrial revival, and its speedy evolution during the next five years, and order to feed the other industries which, to be operated, need electrical otors, e.g. the electrical fans industry, the washing and sewing machines, he vacuum cleaners, the workshop equipment, and pumps etc.... Because of the xtent of the present consumption, and the additional normal increase expected, he erection of a new industry for the production of these motors is justifiable.

The erection of a factory was proposed, producing electrical motors, nd with an output in its first stage of :

| | |
|---|---|
| 22,500 | Single or three-phase induction motors, ranging between 1/20 and 1 H.P. |
| 5,000 | Three-phase squirrel cage induction motors ranging between 1 to 10 H.P. |

This factory will cover the country's demand for electrical motors f these capacities for the next five years.

UGGESTED OUTPUT :

The factory's proposed output per annum will be on the basis of two orking shifts as follows :

| | |
|---|---|
| 10,000 | Complete fans |
| 5,000 | Sewing machine motors |
| 5,000 | Washing machine " |
| 2,500 | Vacuum cleaner " |
| 5,000 | Motors of a capacity of 1 to 10 H.P. |

## 2. PRODUCTION OF ELECTRIC ACCESSORIES FOR AUTOMOTIVE INDUSTRY:

Aim of the Project :

Considering the project for the manufacture of trucks is the First Five Year Plan, with a total output of 3,500 trucks and buses per annum, and its expected future expansion to reach 4,000 trucks and buses, and the suggested projects in the Second Five Year Plan which will result in the manufacture of 2,700 agricultural tractors, 2,000 heavy trucks, and 10,000 passenger cars per annum, it appears that the number of units and the necessary electrical parts for the feeding of these projects are approximately 18,700 units per annum. Each unit consists of a starter, a generator, a regulator, a coil, and windscreen wipers, horns, switches, cut-outs, etc......

As the expected extent of consumption justifies the founding of a special industry for the production of electrical equipment for cars, it was decided to start up this industry with the cooperation of the main factories importing electrical equipment for trucks, buses and cars to be produced in the United Arab Republic.

SUGGESTED OUTPUT :

The suggested annual output of the factory based on working two shifts is as follows :

| | |
|---|---|
| 8,700 | Components of generating and starting systems for diesel engines, tractors and heavy trucks. |
| 10,000 | Components of ignition, generating and starting systems for passenger cars. |

The value of the factory's production output is estimated at approximately £ 504,500 per annum.

## 3. EXTENSION OF THE "ELECTRIC & GENERAL CONTRACTING ENGINEERING CO." FACTORY :

Aim of the Project:

The factory for the "Electric & General Contracting Engineering Co." has been built as part of the First Five Year Plan for the production of the necessary electrical requisites for electric transmission net works consisting of electrical transformers, switches, and switchboards.

The factory's estimated production output in its present form, consisting of electrical transformers with a total capacity of 80,000 K.V.A. on a one-shift basis, can be increased to 120,000 K.V.A. on a two-shift basis, and to 160,000 K.V.A. on a three-shift basis, in addition to which it is possible to produce 500 air circuit breakers, 100 low tension switchboards, and 35 high tension switchboards on a one-shift basis.

The factory can supply the country's demand for these requisites for the next five years, except that the survey which was carried out by the Electricity Board indicates that the total power installed in the country for transformers up to 1000 K.V.A. amounts to approximately 600,000 K.V.A. Working on the basis that the consumption of electricity will be doubled in eight years, the expected annual demand for transformers will be approximately 75,000 K.V.A., and the increase will always be progressive. Thus it was considered necessary to expand the factory in 1964 in order to double its present production.

SUGGESTED OUTPUT :

The suggested annual output of the project based on working one shift is as follows :

| | |
|---|---|
| 70,000 K.V.A. | Transformers |
| 500 | Knife switches |
| 100 | Low tension switchboards |
| 35 | High tension switchboards |

Production may be increased by working on a two-shift or three-shift basis depending on the consumption.

The value of the project's products amounts to approximately L.E. 200,000 per annum.

## 4. COMPLEMENTARY PRODUCTS TO THE "ELECTRO CABLE EGYPT CO."

### Aim of the Project:

The building of a unit was completed during the First Five Year Plan for the manufacture of reinforced ground cables with a tension up to 15,000 volts, and telephone lead covered cables of 1000 pairs. The factory's production is now covering the country's need for insulated and stranded copper wiring. It also produces wires for internal connections, insulated with a rubber, plastic, or cotton coating.

The factory's present working capacity will cover the country's need for these types and kinds for the next five years, including an increase in the number of the present machinery to meet any normal development in consumption.

As the industrial programme consists of several new industries, incorporated as primary materials necessary for the production of some special types, the Egyptian Company for Electrical Cables can undertake with its manufacture and production, the feeding of these industries, just as the size and quantity of these materials justifies the erection of special units pertaining to these, as additions to these factories. These industries have been studied and the following has been decided upon.

First : The manufacture of varnish-coated wiring, supplying factories for electrical motors, starters, and dynamoes for cars, and the factories for equipment for telephone apparatus, fluorescent lamps, small transformers for domestic purposes, and electric bells.

Second: Telephone cords.

Third: Square paper covered wiring for the supply of electrical transformers factories.

The project was based upon the possibility of supplying future industries. The quantity or value of the country's annual imports of these materials in the previous years is, therefore, not being considered, but the needs of each industry for these materials in the future are being taken into account.

**SUGGESTED OUTPUT :**

The annual production of the project is as follows :

| | | |
|---|---|---|
| 265 | Tons | of P.V.C. insulated wiring |
| 65 | " | varnish insulated wiring |
| 60 | " | cotton insulated wiring |
| 10 | " | telephone cords |
| 100 | " | various wiring |

The value of products is estimated at approximately £ 240,000 per annum.

## 5. MANUFACTURE OF FLUERESCENT LAMPS :

### Aim of the Project :

Ordinary incandescent bulbs are produced in two existing factories, one in Alexandria and the other in Ismalia. The extention of the Ismailia factory has recently been approved, so that it may produce 3,000,000 ordinary bulbs apart from those used for cars, railways, and special services.

The output of bulbs in these two factories is sufficient to supply the country's need for the next five years. After studying the country's consumption of fluerescent lamps the use of which is increasing and of which the country imports large quantities, it appeared that the volume of consumption as shown in the following table with a consideration of a rapid increase justifies the erection of a factory for that purpose.

The following table shows imports of fluerescent lamps :

(Item of fluerescent bulbs during the years 1951 to 1958).

| Year | Number | Value in Pounds |
|---|---|---|
| 1951 | 395,927 | 101,147 |
| 1952 | 180,806 | 42,096 |
| 1953 | 175,370 | 39,889 |
| 1954 | 233,967 | 56,010 |
| 1955 | 389,520 | 85,150 |
| 1956 | 251,027 | 251,027 |
| 1957 | 302,219 | 47,105 |
| 1958 | 784,641 | 146,255 |

It appears from the import figures in the above table that there was a progressive import of these bulbs from 1952 to 1955 then a decrease in the year 1956 on account of the triple aggression followed by a second increase in the years 1957 and 1958. If we consider the year 1955 as representing the actual demands in imports, with the exception of the special types of bulbs, the present consumption may be estimated at about 350,000 to 380,000 bulbs per annum.

### SUGGESTED OUTPUT:

From the above and taking into account the expansion in the near future, the production output may be estimated at approximately 500,000 fluerescent lamps per annum of 20, 40 & 60 Watts without reflectors, and of 40 watts with a reflector inside the lamp.

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## IV. Pumps Industry

### 1) Production of Pumps.

### Purpose of Project.

Pumps represent one of the important products indispensable to our agricultural sector for irrigation and drainage, and to our industrial sector for the transport of liquid products, apart from their necessity for drinking water systems and the extraction of petrol.

The needs of the various sectors for pumps of all types have been ascertained, together with imports under this heading in the last five years. Projects of expansion in reclaimed lands, conversion of basin irrigation in Upper Egypt to perennial irrigation, the needs of Land Reform Project, the irrigation of the deserts and the requirements of the petroleum sector have all been likewise taken into consideration.

Imports of all types of pumps in the years 1954-1958 are shown in the following table :-

| Year | 1954 | 1955 | 1956 | 1957 | 1958 |
|---|---|---|---|---|---|
| Quantity-pieces | 1626 | 4134 | 3020 | 1971 | 2314 |
| Value in £. | 182.000 | 607,000 | 563,000 | 330,000 | 443,000 |

### a) Irrigation Projects for Expansion in Reclaimed Lands and Generalisation of Perennial irrigation.

The area proposed for reclamation in Lower Egypt amounts to 300,000 acres, over a period of 10 years, at the rate of 30,000 acres per year. Estimating that half of the area will be irrigated by pumps, and the other half by simple instruments such as the sakia, tambour, and the like namely, 15,000 acres annually, at the rate of one pump for every 100 acreas on an average, the annual needs will amount to 150 pumps, all of the centrifugal type, diameter 6/6 inches.

The basin irrigation lands planned for conversion into persennial irrigation amount to about 800,000 acres, over a period of 10 year. Considering that half of the area will be irrigated by pumps at the rate of one pump 6/6 "diameter on an average for every 100 acres, the needed pumps will be 400 annually, af which about 60 pumps are of the deep well type and the rest, viz 340 pumps, are of the centrifugal type, diameter 4/4 inches average.

An increase of about 2-3 million acres of cultivated land will result from the realisation of the High Dam Project. .It is estimated that it will be started to & prepare that land for cultivation not before a period of 6 years, hence it was decided not to include its needs of pumps in the present study, their production being delayed to a stage following the Dam Project.

B) Irrigation & Drainage Projects.

Large irrigation and drainage pumps necessary for stations belonging to the Mechanical and Electric Department amount to about 10-15 pumps annually, volume of water drained ranging between 3-5 cubic meters per second, at a head of 2-3 meters. These pumps are necessary for [illegible] the canals after executing the projects of expansion in converting the basin irrigation to perennial irrigation and reclamation of [illegible] lands.

In view of the little number and huge size of these pumps it has been decided to put aside their production temporarily owing to its difficulty, and to resume its study after gaining experience in the industry of pumps with 4-10 inches diameter.

The needs of stations fitted with such large pumps, from [illegible] pumps 4-6 inches diameter, amount to about 10 pumps for each station thus giving a total of about 150 pumps 4-6" diameter annually.

Requirements of the various Government Departments amount to about 20 pumps annually, of the small size, 4-6" diameter.

C). Desert Irrigation Projects.

Studies undertaken at present regarding reclamation of desert land have so far shown that wells hitherto dug do not need pumps for raising their water which gushes with sufficient force for exploitation in desert irrigation. The needs of this sector have not, therefore, been taken into consideration in/this study.

D). Petroleum Projects.

Pumps necessary for petroleum projects are of 3 kinds :-

1) well pumps for raising crude petrol, to the ground level from depths

reaching 2000-3000 metres nearly. They are of the reciprocating high pressure type and need special specification for their production.

The needs of such pumps are estimated at about 20 pumps annually. Some Petroleum Companies have made an attempt to produce some spare parts of these paumps and have succeeded in their attempts after having been provided with the required raw material such as stainless steel. In view of the fact that the needs of this type is not large enough to justify the creation of an industry for it, it has been considered advisable to leave the matter to the efforts of the Petroleum Companies in order that they may increase their production of spare parts and other accessories necessary for their functioning locally.

2. Pumps for transporting petrol through pipelines and to storage tanks.

These are mostly of the centrifugal type made of a special anti - petrol material.

The annual needs are estimated at about 100 pumps, discharge 20-60 cubic meters per hour, at a head ranging between 20-30 metres. In view of the fact that the production of these pumps does not differ from that of irrigation pumps except that they are of high pressure, it has been considered possible to produce them as well as those needed for the transport of chemical materials in factories (not yet ascertained) after the elapse of about two years from the running production of the pumps factory.

3. Motor-car Service Station Pumps.

Considering that the manufacture of these pumps differs entirely from that of ordinary pumps in that the pump and counter annexed to it form one unit for delivery and counting, it has been decided to set up a special industry for this type of pumps, which will be mentioned later amont miscellaneous engineering small industries.

e). Hand Pumps.

The annual needs of these pumps are estimated at about 7500 pumps, some of which are necessary for raising drinking water in the villages, and the rest are used as starting pumps for large pumps as well as for the transport of pertroleum articles in small quantities.

All these pumps are produced in scattered local workshops, but not of a worthy standard. It is considered that the projected factory will produce 5000 hand pumps yearly, size 1-2", the remaining need being met by the local workshops which will have to improve their production to the standard of the proposed mass production.

### f). Pumps Driven by Air Fans.

Such pumps of about 2 inches diameter are used in distant areas where energy of the wind can be used for driving them through air fans. The needs of this pump are estimated at about 500 pumps annually of the piston type. It is considered essential to produce this type of pumps, especially as the Military Factories produce at present the air fans necessary for driving these pumps.

### The Local Production of Pumps

There exist at present two factories producing centrifugal and spiral pumps necessary for irrigation. Their annual production is estimated at about 400-500 pumps. There also exist some founderies and workshops for the production of pumps on a small scale, ranging between 5-10 pumps annually. All these factories depend in their production on imitating a certain type of pumps irrespective of their efficiency or suitability to the purpose for which the pump is designed.

The production of pumps necessary for our needs requires special designs suitable for the purpose for which such pumps are used, and this requires a designing office to be permanently attached to the factory, apart from making tests for ascertaining the characteristics and the efficiency of the pumps. All the existing local factories, with the exception of two, have no instruments for testing pumps, and all of them have no offices for designing and drawing.

The local production of pumps in the years 1954-58 has amounted to the following :

| Year | 1954 | 1955 | 1956 | 1957 | 1958 |
|---|---|---|---|---|---|
| Number | 300 | 350 | 600 | 850 | 1000 |
| Value.. | 12,000 | 14,000 | 24,000 | 34,000 | 40,000 |

Adding imports to local production, the annual consumption of pumps in the years 1954-58 is as follows :

| Year | 1954 | 1955 | 1956 | 1957 | 1958 |
|---|---|---|---|---|---|
| Number | 1926 | 4484 | 3620 | 2821 | 3314 |
| Value.. | 194,000 | 621,000 | 587,000 | 364,000 | 483,000 |

This gives an annual average of 3200 pumps approximately, including all types of pumps for the various sectors.

Deducting from this the local present production, amounting to 1000 pumps annually, the average needs required to be produced up to 1958 will be about 2200 pumps, including certain types which it has been decided not to produce on account either of their insignificant number or of their need for huge equipment which makes their production uneconomical. These are estimated at about 200 pumps approximately, thus giving a total of 2000 pumps which are required to be produced annually.

By adding the needs of the various projects referred to above, amounting to 800 pumps annually, the needed output will be about 2800 pumps annually, which may increase to 3000 centrifugal pumps.

Study has shown that deef well pumps, whether driven by Diesel engine or an electric motor through belts or gear boxes /,or submerged electric motor forming one unit with the pump, are likely to meet with a wide demand owing to the gradual lowdring of the subterranian water as observed by the competent authorities. It has, therefore, been decided to include in the proposed production programme 200 pumps annually, excluding the production of electric motors or gear boxes, and beginning with the production of the type driven through a transmission shaft & gear box. It has also been decided to study the production of the submerged type since it has been found that there are but a few world firms specialized in producing the submerged electric pump.

Proposed Capacity.

According to the above, the productive capacity of the proposed factory will be :-

3000 Centrifugal pumps, sizes 4-6-8-10 inches.

5000 Hand pumps for water and petrol, dismeters 1,1½ & 2"

200 Deep well pumps and submerged electric pumps, dismeter. 6,8,10 inches diam.

500 Piston Pumps driven by air fans, diameter 2"

The value of the annual production of the factory is estimated at about £ 342,500.

The production of pumps requires the laying down of binding specification to be followed by the existing manufacturers and the proposed factory, apart from obtaining the know-how from one of the firms specialized in the production of pumps, and the selection of the most suitable types for our local conditions of irrigation, from the point of view of discharge & head, so as to secure the best possible efficiency.

The factory will also undertake the assembling of groups of pumps & electric or diezel motors, and the testing of same, at the rate of 1000 units annually.

# V.- SPARE PARTS INDUSTRIES

## 1.- Production of Spare Parts for Textile Industry

### Purpose of Project

The production of spare parts for textile industries regarded as a complicated industry as it embraces a very numerous and widely different variety of spare parts, both from the view points of type and material. The study of this industry has necessitated the drawing up of a comprehensive statistic of the existing equipments in the large spinning and textile factories which represent 85% of the local production, and which alone contain 850,000 spinning machines out of a total of 1,050,000 in all the Southern Region.

The statistic referred to included the manufacturer of the various equipment so that it may be possible to ascertain the degree of similarity among them with a view to estimating the assimilated spare parts which could be produced in an economic way. The study revealed the following facts :-

### Spinning Machines

#### a) Blowing Room equipment

The most prevailing machines in that section are of the "Platt" English type, and represent about 28% of the total machines. Next come the " Ritter" Swiss machines, representing about 15% of the total number. The remainder are of various other types numbering about 12 makers.

#### b) Carding equipment

The carding machines in the Egyptian region amount to about 5000 machines, 2400 of which are of " Platt" type, 1000 Ritter, and the remainder are of miscellaneous makers about 11 in number.

#### c) Combing equipment

Combing machines in the Egyptian region amount to about 150, the number of units in each machine varies from 6 to 8 deliveries. The total combing deliveries are about 1000, of which 15% Rieter, 15% Platt, 15% Whiten ( American), and the remainder of miscellaneous makers, about 15 in number.

d) Drawing, Roving & Ring Spinning Equipment

These include 1,050,000 spindles, about 25% of which Platt, 20% Rieter, and the remainder about 15 miscellaneous makers.

e) Other auxiliary equipment of simple construction

These are used in complementary processes such as warping, weaving winding, twisting, waxing and singeing.

Weaving Machines

Makers for existing Weaving Machines are as follows :-

" Northrop" representing 10% of the total textile machines.

"Rutfi" representing 5%, "Droper" representing 5% and the remainder of about 20 miscellaneous makers.

From this statistical study, can be seen the large number of textile machines makers. This necessitates the centralization of experience in one specialized authority under the supervision of reponsible staff with full knowledge of textile industry. On these lines, assimilated items can be grouped together, and slight modifications introduced in the variant spare parts bringing them to closer similarity and making their production economically profitable. By these means, it will also be possible to manufacture the products according to international standards concerning this industry.

Some of these parts are produced at present by local workshops, being badly needed, although not according to proper specifications and being non-precisely manufactured. Mehalla-El-Kubra and Kafr-El-Dawar factories are also producing a small part of their requirements, and they are naturally not in a position to meet the requirements of other textile factories.

A special study of the needs of local textile factories has led to the selection of the following items to be produced locally. They are needed in large numbers which make their production economically sound, apart from being fit to a large extent for many machines of different makers, especially if slight modifications are introduced into some of them. The following is a statement of these parts distributed according to the various textile processes. Present imports of these parts are £. 1,200,000 annually.

1. Spare parts for the Blowing Equipment

   spiked lattice - bars & axles.

2. Spare parts for Carding Machines

   saw teeth wire - emery fillet - fly & stripping comb - levers

3. Spare parts for Combing Section

   needles - fluted rollers - cams - levers & shafts

4. Spare parts for Drawing Operations

   fiber cans - fluted rollers

5. Spare parts for Roving Operations

   long spindles - flyers & pressers - fluted rollers - belt shifters - long racks - long spindle collars - cleaner cloth.

6. Spare parts for Final Spinning & Twisting Operations

   spindles - inserts for spindles - rings - ring travellers - drawing cylinders with grooves - cleaner cloth - cams, camshaft - castings ( only machining ) - paper tubes & cones.

7. Spare parts for Winding Operations

   Combs - cones - cams - guide wires - levers for automatic stop motion.

8. Spare parts for Warping & Sizing Operations

   reeds - bars & axles - friction coupling apparatus - beams - special cylinders - cylinders' coatings - cooking pots - bars.

9. Spare parts for Looms

cams & auxiliary reels - temples - weft fork of various types - reeds - droppers.

10. Raiser's Feeler Apparatus

beams - fibre - heads - jacquard's apparatus with all accessories - dobby's apparatus with all accessories - crank shafts - clipses.

11. Working Levers

hooks - boxes - slays - shuttles - pushing sticks - take up bobbin's cylinders.

12. General Articles

knitting machines for threads and their spare parts - cafton reels

The quantities needed from these parts have be estimated on the following basis :

1 - Shuttles

25000 Looms exist in the Southern Region.

The average depreciation period of the shuttle is about 3 months and it costs about one £g. Accordingly the annual demand could be estimated to be 100.000 shuttle worth 100.000 £g. It is possible to unify the different types of shuttles into 6 different sizes so as to cover the utilisation of the different types of Looms.

2 - Spindles and Rings

1.000.000 Spindles exist in the Southern Region.

The average depreciation period of the spindle is considered 20 years. Thus the annual demand can be estimated to be 50.000 Spindles and 50.000 Rings. As the Spindle costs from 5 to 10 £g. and the Ring costs about 50 P.T., therefore the total value of the annual demand of Spindles amounts to about 300.000 £g. and of the Rings about 20,000 £g.

3 - Spinning Rings

Annual consumption amounts about 150 million Spinning Rings worth 15,000 £g.

4 - Velvet for gathering wastes

The Value of Annual imports amount to 50,000 £g.

5 - Drawing Cylinders

The value of annual imports amount to 60,000 £g. for all manufacturing processes.

6 - Other spare parts

£ 600,000 worth of these is imported annually.

The total value of annual imports of spare parts which will be locally produced is therefore £. 1,200,000.

The proposed project for the production of spare parts for textile equipment includes specialized sections and assimilated parts. The total value of the needed equipment amounts to about £. 450,000 distributed as follows :

£. 200,000 units for the production of paper necessary for the making of cylinders and bobbins.

40,000 units for the making of shuttles

209,000 equipment for the making of metal parts.

1,000 units for the making of velvet for gathering waste.

£.450, 000 .

The said factory will depend on local workshops for obtaining some non-machined parts such as castings.

A factory is being at present set up for the production of spinning machines as part of the First Five Year Plan. The said factory will produce about 15% only of the requirements of the textile sector. It will produce also about 35% of the spare parts necessary for its output of machines. Demand for spare parts for existing machines will therefore continue for a period which may extend to nearly 25 Years. Some sort of cooperation may be established in future among the spinning machines Factory for the production of spare parts when future extension of local production of spinning machines is realised and when local production of weaving machines is started.

It is clear from the foregoing that the proposed weaving and spinning spare parts factory is complementary to the spinning machines factory which is being set up as part of the First Five Year Plan.

## Productive Capacity

The production of £. 1,000,000 worth of weaving and spinning spare parts.

## 2.- Production of Petroleum Spare Parts
## Purpose of Project

Petroleum industry combines four main processes :

1. Well drilling.
2. Well exploiting ( extraction of oil )
3. Petrol refining.
4. Transport and storage of petroleum.

### 1 - Well Drilling

This process needs the following spare parts :-

a) Drilling Bits

American firms continued to monopolize the making of drilling bits until after the second world war. Owing to currency crisis between Europe and America, England succeededin attracting American capital for the setting up of branches in England for American factories producing drilling bits used in Europe and the Middle East. Egypt imported from England paying hard currency until other countries such as Germany, France and Italy got the same privileges.

When the number of drilling rigs in Egypt reaches 23 in the near future, in addition to the needs of the Syrian region and water wells, the country will have to import about 15,000 drilling bits of various sizes ranging between 4 $\frac{5}{8}$ & 17 $\frac{1}{2}$ inches, and costing about 3 million dollars annually.

Consumption will continue to increase; it is expected to represent in 1962 about 40% of the present consumption of all Middle East countries.

It has become imperative, therefore, to set up an industry for the production of drilling bits in the Egyptian Region for saving the hard currency spent on importing them, and for ensuring the non-suspension of drilling processes when import becomes difficult for force majeure reasons.

Extension in Forging Factory – in the Second Five Year Plan includes the necessary equipment for the production of drilling bits.

b) Hollow shafts and well casings :

These are made of seamless pipes, and are being studied in connection with pipes industry.

c) Drilling Stems

These are made of forged steel and will be produced at the Forging Factory which is being set up at present.

d) Spare Parts for Oil-Shales Pumps :

1. Liners :

These are being produced locally at present, but of a low standard. It is necessary to import centrifugal casting equipment, as well as two electric induction furnaces. By adding these equipments to one of the workshops specialised for this industry, it will be able to fulfil the needs of the petroleum industry as well as the automotive industry.

2. Rubber parts :

These can be produced locally at existing factories without additional equipment.

2 – Well Maintenance :

This industry needs the following spare parts :-

a) Liners :

These are similar to Oil-Shales pumps liners and can be produced by the same equipments.

b) Ball Valves and seats :

The valve consists of a ball of nickel, and its seat of Tungsten carbide. There is no need to produce it locally owing to its low demand.

c) Sucker Rods :

This is made of forged steel and can be produced in the Forging Factory now being set up.

d) Gears and Bushes :

These are made of forged steel and can be produced at the Forgings Factory. Teeth are being milled in local workshops without adding special equipment.

3 - Petrol Refining

This industry requires the following spare parts :-

a) Pumps :

These are of numerous types. They come under two main headings :

1) Centrifugal Pumps. All relevant spare parts can be made locally without additional equipment, with the exception of packings which are made of asbestos and graphite. This industry is being studied at present with a view to setting it up in the Egyptian Region.

2) Piston Pumps . Relevant spare parts can be provided by the same way as in the case of drilling and exploiting pumps.

b) Coolers, Condensers and Heat Exchangers :

These mainly require :-

1) Copper tubes. Now locally produced.

2) Seamless steel tubes. Their production is being studied among tubes industry projects.

3) Copper alluminium tubes. Not produced locally, and we annually need about 150 tons of them for petroleum and other purposes. Their production forms part of projects for tubes industry.

4) Valves. Low pressure valves are locally produced from cast steel, cast iron and copper. High pressure valves are made from forged steel up to a diameter of 2", and can be produced locally in the Forging Factory. Larger sizes, up to 24" diameter, are made of cast steel and can be produced locally without

additional equipment.

5) Inner parts of valves. These are made of stainless steel, the production of which is now being studied among basic metal industries.

6) Flanges. These are made of forged steel, and can be produced by the Forging Factory.

7) Forged Pipe Fittings. These required special methods for producing them, and it is preferable to postpone their production for the time being, especially as there is no big demand for them and their production needs costly equipment.

8) Burners. Their production is being studied at present among production equipment.

4 - Transport of Petrol : Main requirements :-

a) Tubes. Seamless tubes, project being studied at present.

b) Pumps. Spare parts thereof can be produced in the same way previously mentioned for petroleum refinery pumps.

c) Flanges. These can be produced locally from forged steel at the Forgings Factory.

d) Valves. Locally produced from cast iron.

From the foregoing it would appear that providing the petroleum industry with the necessary spare parts only requires expansion in one of the existing founderies, for the production of cast-iron Liners for pumps.

Productive Capacity.

Production of cast-iron liners, worth about £. 200,000.

## 3.- Production of Spare Parts for Railways .

### Purpose of Project

The railways require numerous spare parts for wagons and locomotives. The Railways Authority has for a long time been producing a good part of their requirements of spare parts at their own and other government and private workshops.

The Railways Authority is at present extending its use of diezel locomotives on its lines instead of steam locomotives. This trend has had its great effect on the study of the situation with regard to spare parts necessary for locomotives, there being at present 235 diezel locomotive owned by the Railways Authority, which are likely to increase to 582 by the en end of July, 1963, to be followed by a further increase in conformity with the policy of generalisation of diezel locomotives, thus adding 300 new ones.

It is estimated that 70% of the total requirements of spare parts for steam and diezel locomotives, and wagons can be produced locally. These Spare Parts come under the following headings :

1. Cast-iron spare parts. These are casted locally and machined at Railways workshops.
2. Forgings. ( including raw material). These are included in the Forging Factory production programme.
3. Steel tyres. Already studied with Forging Factory, and their production was found uneconomic.
4. Wheels. Military Factories are studying at present the manufacture of cast steel wheels.
5. Pistons, piston ring, gudgen-pins, bearing sleeves, filters, asbestos gaskets, carbon bushes, radiotors, parts of injectors, isolating materials for motors and electric generators, electric

cables, rubber belts. These parts are being studied in the First and Second Five Year Plans.

6. Air brakes. ( Compressors & Air circuit valves ) A large percentage of their spare parts is not produced locally.

It would appear from the foregoing that all railway requirements of spare parts can be met by existing industries and First and Second Five Year Plans. There is no need for setting up a new engineering industry except for Air Brakes, the situation of which is summed up in the following:

1. Locomotives

   a) Diezel locomotives existing at present in the Southern Region amount to 235 locomotives, consuming about 100,000 dollars worth of brakes spare parts annually ( £. 80,000 )

   b) Within the next three years, the number of diezel locomotives in the Southern Region will be 582, consumption of brakes spare parts will thus rise to 300,000 dollars worth annually ( £.250,000).

   All spare parts, consumed and mentioned above, are imported.

2. Wagons .

   a) Passenger wagons. An attempt is now being made for the unification of air brake systems.

   b) Goods wagons. There exist at present 25,000 goods wagons not fitted with brakes, and for being so fitted, require £. 1,000,000. A sum of £. 50,000 can be estimated annually for maintenance of wagon brakes of all kinds, by imported spare parts.

Thus, the value of spare parts imported annually for the maintenance of brakes of engines and wagons of all kinds, can be estimated at £.300,000. This justifies the establishment of a new industry for the production of brakes for railway locomotives and wagons, as well as for trucks. It is to be noted that trucks' brakes required annually for the Trucks Factory are worth £. 100,000.

Productive Capacity.

The production of £. 480,000 worth of air brakes annually.

## Production of Spare Parts for Cars and Tractors.

### Purpose of the Project.

Spare parts for cars and tractors constitute a fundamental element in the local industries for cars and tractors which are being studied as part of the first and second five year plans. Study of these industries has been completed on the basis of their dependence upon local feeding industries and of confining production in the main factories to such parts whose production do not need heavy equipment. This is apt to improve the economics of the main automotive industry, and to make possible the rapid development of that industry. This shows the great importance of setting up the spare parts indusries as feeding industries to the main industries of cars and tractors.

The need is greater also of spare parts for the maintenance of cars and tractors in use which absorb large amounts of hard foreign currency for the import of spare parts necessary for them. Although makers and models of such vehicles are numerous, yet similarity or approximity prevails amongst a good number of them to justify their production economically. As cars and tractors produced locally increase, so will also increase the similarity among spare parts needed for them, thus steadily improving the economic conditions of the spare parts industry.

The spare parts necessary for the maintenance of cars and tractors may be classified under the following headings :-

1) Spare parts which can be produced locally by using the existing capacity,
without the need of additional new equipment. These Brake drums - cooling
system - hoses & tyres - electric wiring - bolts & nuts - exhaust pipes
& silencers - Copper tubes.

2) Spare parts included in the First Five Year Plan
These are : Liquid batteries - leaf springs - brake liners - clutch disc-
fans & brake drums - Rings, liners & gaskets - radiators
bearings white metal alloys - Non ferrous Pistons - rubber
parts pins - Values - spark plugs - electric equipments (except the
the regulated distributor & coils)

3) Spare parts which should be included in the Second Five Year Plan.
These are : Steel wire ropes for mechanical brake - air brake system -
hydraulic brake system - Oil & grease seals - oil pumps for
lubrication - fuel injectors - shoe brakes - rubber belts -
convex mirrors - heaters for diesel engines - voltage regulator
for charging batteries - distributors - high voltage coils
bulbs - meters - helical springs.

4) Spare parts the production of which is advisable to be postponed thereof until sufficient technical experience is obtained, namely: These are : Fuel injection pumps (solar) - carburettors.

Thus it will be seen that the engineering industries which should be set up as part of the Second Five Year Plan include the production of the following spare parts shown under two groups :-

The first group to be produced through extension of existing factories or have been included in the First Five Year Plan, namely :

1. Manufacturing of helical springs : as extension for leaf spring project
2. Manufacturing of raw materials for brake liners : as extension for brake liners project
3. Manufacturing of heaters for diesel engines : as extension for spark plugs project
4. Volt regulator for battery charging, distributor & high voltage coil
5. Radiators for passengers cars, and radiator tanks for trucks : Considered as an extension in the radiators industry.

The second group includes new projects which should be included in the second Five Year Plan, namely :

1. Measuring meters (for speed, temperature and pressure).
2. Seals (for oil and grease).
3. Fuel injectors
4. Hydraulic brakes' cylinders
5. compressed air assemblys for working hydraulic brakes.

Needs of spare parts have been estimated, as well as the economic study for the possibilities of the proposed extensions and new projects have been studied, on the basis of feeding the local industries of cars and tractors in use, as follows :-

| | |
|---|---|
| Trucks produced locally ............. | 3500 |
| Passenger cars produced locally...... | 10000 |
| Agricultural tractors " ...... | 2700 |
| Trucks in use for civilianse......... | 30000 |
| Passenger Cars " " ......... | 70000 |
| Trucks & cars for Armed Forces and Governmented Depts............... | 20000 |
| T o t a l | 136,200 |

Spare parts for which new factories are to be established have also been estimated as hown hereunder :-

1). Measuring Meters (for speed, temperature and pressure).

| | | | |
|---|---|---|---|
| Speed meters .............. | 10,500 | worth | £ 31,500 |
| Temperature meters ........ | 12,000 | " | £ 30,000 |
| Pressure .................. | 12,000 | " | £ 18,000 |

These extimates have been made on the assumption that : 20% of the working cars are assimilated and spare parts for them can be produced, that the speed meter is not replaced throughout the service-period of the car, that the life-time of the car is 10 years, and that pressure and temperature meters are replaced once during that period in respect of cars whose owners are interested in such meters only and which represent 20% of the assimilated working cars.

2). Seals (for oil, grease and water).

355,000 Seals ........ worth £355,000.

This estimate has been based on the assumption that every locally produced car needs 10 seals, and that in respect of used cars all kinds of seals are replaced every three years. It has also been taken into consideration that trucks and tractors are depreciated more quickly than ordinary cars, and that about 40% only of the total working vehicles can be regarded as assimilated and seals can be produced for them.

3) Fuel Injectors

52,000 complete injectors, worth £ 520,000

14,000 spare parts for injectors, worth £ 12,000

These estimates have been made on the basis of producing new fuel injectors for all trucks, tractors and diesel engines produced locally, and on the assumption that trucks in use represent 15% of the total trucks and that 50% only of this number is assimilated, that half of the injectors' internal sets is changed once only during the life-time of the vehicle, and that there exist 6 injectors in the motor.

4) Hydraulic Brakes, Cylinders

1500 complete cylinder sets (each setcconsists of 5 cylinders) worth £ 200,000.

This estimate is based on the ground of producing groups containing 5 cylinders for cars produced locally, as it is rare that such cylinders are changed in used cars.

5) Compressed Air Assemblies for working hydraulic brakes.

These groups are used only trucks to be produced locally. They are rarely changed for trucks in use. Number of groups needed for locally produced trucks is estimated at 3500, worth £ 100,000 approximately. The production of these assemblies has been added to the spare parts needed for railways air brakes.

Productive Capacity.

Production of spare parts for cars and tractors as explained above, to the value of about £ 2,500,000 annually.

## VI. MISCELLANEOUS SMALL ENGINEERING INDUSTRIES

A) Rifles :

Military Factories in the Egyptian Region produce small arms. This local industry has so developed that it now stands in the first rank as compared with more advanced countries in this field. It has been found possible to make use of the experience and equipment not fully loaded in the Military Factories for the production of training, guarding and shooting rifles. Following is a resumé of the situation in respect of the production of each kind of these rifles :

1. Training Rifles:

Rifles of the calibre 0.22 have been chosen as suitable for the training of armed and popular forces instead of the field weapons which are now being used for training. Extension in this industry will go hand in hand with enlargement in the armed forces of the United Arab Republic and the spread of Military consciousness. This industry will begin with the least economic limit possible, namely, 5,000 rifles every year to be gradually increased as local demand increases and opportunities for export arise.

Productive Capacity:

5,000 rifles annually, worth £ 125,000

2. Guarding Rifles :

The Egyptian Region imports annually an average of 4106 guarding and shooting rifles to the value of £ 40,645.- The economic limit for producing this type of rifles has been found to be 5,000 rifles annually, and this amount was, therefore, considered a good basis for starting the industry in question, the output being increased in future as local demand and opportunities of export increase.

**Productive Capacity:**

5,000 Rifles annually, worth £ 225,000

### 3. Air Shooting Rifles:

The Egyptian Region imports an average of 7276 rifles of this kind annually, worth £ 58,474.- It can be said that this amount does not represent the real local demand, in view of import restrictions. Study of the market reveals that the real local demand absorbs about 15,000 rifles annually, and this figure which exceeds the economic starting limit for production has been taken as a basis for establishing this industry.

**Productive Capacity:**

15,000 rifles annually worth £ 135,000

## B) Other Projects :

### 4. Typewriters:

The Egyptian Region imports typewriters of various kinds worth an average of £ 133,000 annually. The volume of annual demand for typewriters of the most prevailing kinds is estimated at about 1600 machines. The project has, therefore, been planned on the basis of producing 2,000 typewriters annually worth £ 120,000.- The surplus 400 machines will be exported.

This project can be carried out by exploiting the surplus local productive capacity whether in the Military workshops or other local factories where the necessary equipment is available.

**Productive Capacity:**

2,000 Typewriters.

5. **Counting Machines:**

The Egyptian Region imports an average of 1244 Counting Machines annually worth £ 164,400.- The most prevailing types are the hand-counting machines with 9 figures, being easily used and need no electricity. Other more complicated electric counting machines may be produced in future, after gaining experience in this industry.

Study of the local market has shown that about 800 machines of this kind are demanded every year. The project has, therefore, been planned on the basis of producing 1000 machines annually, worth £ 120,000, which represents the minimum economic limit for production. The surplus will be exported.

The project can be carried out by exploiting surplus productive capacity either at military workshops or other local factories where pressing machines of medium capacity, which are considered to be the essential equipment for this industry are available.

**Productive Capacity:**

1,000 Counting Machines annually.

6. **Semi-Automatic Weighing Machines:**

The Egyptian Region imports large quantities of semi-automatic weighing machines of all kinds and sizes. Study of the local market has shown that the kinds most prevailing are of the medium size, used in commercial shops, and whose capacity reaches 10 kilos, as detailed below :

| | | | | | |
|---|---|---|---|---|---|
| 600 | Semi-Automatic | weighing | machines, | 1 - 3 | Kilos |
| 1,200 | " | " | " | 1 - 6 | " |
| 600 | " | " | " | 1 -10 | " |

**Productive Capacity:**

2,400 Semi-Automatic Weighing Machines annually, worth £ 93,600.-

## 7. Ball Bearings:

The Egyptian Region imports annually large quantities of ball bearings which are used as spare parts for a good number of equipment, in addition to their being considered as an important spare part in many of the industries which will be established under the industrialization programme.

As this industry is precise and of high technical standard and needs costly equipment, in addition to the method of production being normally automatic, which raises to a large degree the economic limit of output, it follows that the establishment of a full industry for ball bearings is not economically sound on account of the little local demand which makes the sale price double the import price. The average latter price is 300 mills. while the average former is 600 mills.

The project was, therefore, studied on the basis of repairing the used ball bearings and manufacturing new ball bearings with the exception of the balls which will have to be imported from abroad temporarily until such a time as the local industry makes progress and the volume of demand increases. It will then be possible to produce the balls locally.

On this basis the project has become economically sound.

The productive capacity of the project has been calculated on the basis of volumes of demand of the local market and requirements of the various industries included under the industrialization programme.

## Productive Capacity:

Production of 200,000 new ball bearings and repairing 500,000 used ball bearings annually, worth £ 189,000.-

8. Petrol Pumps for Service Stations:

Applications for establishing service stations for the sale of petrol are steadily increasing on account of the continual increase in motor cars, extension of the roads net, and the flourishing of industry and commerce in the Egyptian Region.

Study of the local market has revealed that our requirements of petrol service station pumps amount to 500 pumps annually for the establishment of new service stations and replacement of unserviceable pumps at existing stations. The project has, therefore, been devised on the basis of this figure annually.

Productive Capacity:

500 Petrol Pumps annually, worth £ 125,000

9. Sailing Planes:

Sail flying is regarded as a strong means of increasing popular consciousness about flying, as well as of preparing individuals for times of need when things come to a crisis and the need for preparing airmen in a short period becomes strong. Moreover, sail flying is a favourite recreation of the young.

Sail flying is not sufficiently attended to at present on account of the prohibitive price of the planes and the difficulty of their import. The production of sailing planes locally has, therefore, been studied on the ground of encouraging this kind of recreation by extension of establishing sail-flying institutes in the United Arab Republic. It is proposed to establish six such institutes in the UAR during the next four years. About 18 planes will thus be required every year, and the annual output of the project will be 20 planes.

There is at present a surplus capacity at the Heliopolis Aeroplanes Factory which could be employed for producing sailing planes.

Productive Capacity:

20 sailing planes annually, worth £ 36,000

10. Mechanical Children Toys:

The Egyptian Region imports £ 80,300 worth of automatic children toys of various kinds annually. This does not represent the real requirement of the local market on account of the import restrictions and the high price on account of little supply and big demand. Study of the local market has shown that the requirement of toys is about £ 99,000 worth annually, and the project has been planned on this basis.

Productive Capacity:

Automatic Children toys worth £ 99,350

11. Metal Nets :

The Southern Region imports annually an average of 430 tons of metal nets. There exist at present some workshops which produce about 120 tons annually. On account of the extension in setting up rural cooperatives which necessitate the establishment of enclosures for poultry, as well as the steady increase of the needs of certain industries for metal nets, it has been found necessary to extend this industry so as to enable the existing workshops to meet the shortage suffered by the local market.

Productive Capacity:

350 tons annually, worth £ 49,000

12. Domestic & Industrial Electric Articles :

There is a continual demand for domestic and industrial electric articles on account of the steady improvement of the standard of living and industrial advancement. Owing to the import restrictions imposed on such instruments, the quantities imported do not in any way represent the real local requirement. A study of the local market and possibilities of export to the Arab countries show that the need amounts to 5,000 various units worth £ 166,000 annually. These items include :

- Washing machines of various kinds, simple and mechanical, for domestic & industrial purposes
- Electric sweepers
- Electric cleaners for parquet floors
- Electric iron
- Electric absorbers and drainers
- Electric fans
- Various electric domestic articles

Productive Capacity:

5,000 units annually, worth £ 166,000

13. Hand Watches:

The Southern Region imports large quantities of hand watches of different models. A study of the local market has revealed that about 130,000 men and ladies' hand watches are demanded every year. There exists at present in the Southern Region an industry for watches spare parts, as well as for the making of alarm watches - a good prelude for the production of hand watches.

Productive Capacity:

130,000 watches annually, worth £ 520,000

14. Medical and Sun Eye-Glasses Frames:

The Egyptian Region imports as much as £ 100,000 worth of frames and complete eye-glasses, on an average. A study of the local market has revealed that the local annual consumption amounts to 75,000 frames made of cyloloid or metal or of both together, to the value of £ 45,000.- The establishment of this industry has been designed on the basis of this volume of the local market requirement.

Productive Capacity:

Eye-Glasses Frames, worth £ 45,000

15. Metal Artificial Jewellery:

A study of the local and other Arab markets has shown that the annual total consumption of the Egyptian market and potential export to the Arab States amount to £ 85,000 worth of metal artificial jewellery such as bracelets, necklaces, neck-tie pins, watch cases, etc. The project of this industry has been devised on this basis.

Productive Capacity:

Artificial metal jewellery worth £ 85,000

16. Steel Scaffoldings & Sheets for Concrete Constructions:

The Egyptian Region consumes a large quantity of wood imported for building operations and concrete constructions. Considering that the iron industry has been set up in the Egyptian Region, it has become preferrable to use the scaffoldings and sheets made of the locally produced iron instead of the wood imported from abroad.

Scaffoldings and sheets made of iron have the advantage of being quickly and easily put up and dismantled in addition to exactness in the shape required. A study of the local and other rab markets has shown that an amount of £ 50,000 worth can be isposed of, and the industry has been proposed on this basis.

roductive Capacity:

Scaffoldings and steel sheets for concrete constructions, orth £ 50,000 annually.

17. Milk Containers:

The purpose of this project is to produce alluminium milk containers for handling milk in a hygienic way between the farms, villages and milk dairies, as well as for improving means of its distribution among the people and meeting the needs of the Arab countries. Demand for milk containers is steadily increasing as a result of extension in the animal wealth, and the creation of milk pasteurisation factories.

Study of the local market, the needs of milk pasteurisation factories and potential export has revealed that the holding capacity of milk containers ranges between 5 and 30 litres. The annual requirement is worth £ 163,500.-

The surplus local capacity in factories where heavy presses are available can be used for this purpose.

Productive Capacity:

Milk containers, holding capacity between 5 and 30 litres, worth £ 163,500.-

18. Artificial Limbs:

The Egyptian Region needs about 500 artificial limbs annually for injured armed forces men and civilians - a total value of £ 20,000.- The Veterans Society has made good efforts for providing this humanitarian service by trying to set up the said industry for meeting the needs of the armed forces, the Hospitals Day Project, and individual demands.

Productive Capacity:

500 Artificial Limb, worth £ 20,000

ebm.

## VII. WOOD INDUSTRIES

### 1. Imprignation of Wood.

Purpose of Project:

The upkeep of wood used in the country - which cost about £ 9,000.000 annually - necessitates its imprignation by one of the various methods adopted for this purpose, for protecting its against the effects of heat, humidity, atmospheric factors, agricultural pests and insects. This imprignation is specially essential for wood employed in the soil, such as flanks, telephone posts, as well as those exposed to water and atmospheric factors, such as cooling towers, ships, yaughts, bridges, etc.

It has, therefore, been considered advisable to set up a unit for the imprignation of wood.

Productive Capacity.

Estimated at about 25,000 cubic metres of wood annually, in one shift.

### 2. Wood Sawing, Drying & Seasoning

Purpose of Project.

The Southern Region imports annually about 165,000 tons of wood in the form of boards, equivalent to about 220,000 cubic metres, worth about £ 6,000,000. It has been considered possible to save a large amount of foreign currency transmitted abroad for the import of this wood, by establishing two units for sawing and drying wood on the basis of importing timber logs to be processed locally instead of importing boards.

It is possible to begin by producing about half the quantity imported. As the resources are differently located, such as Western Africa and South-Eastern States of Asia from which timber logs come to Suez, it has been proposed to set up two units, with a capacity of 50,000 cubic metres each annually, one in Alexandria and the other in Suez.

Imported timber logs will be used in proportion of 100% in the first ten years, to diminish gradually according to replacement from Egyptian trees.

Productive Capacity.

50,000 cubic metres annually, working 3 shifts.

3. Production of Plywood

Purpose of Project.

There exist at present 3 factories producing plywood with a total output of about 13 cubic metres daily. This amount can be doubled if the said factories work two shifts, thus increasing the daily output to 26 cubic metres, i.e. 7800 cubic metres annually, equivalent to about 8000 tons.

The country consumes about 15,000 tons annually, worth £ 1,000,000.

As the project of hardboard included under the first 5-year plan will produce about 7000 tons annually of hardboard which is considered as substitute for plywodd, the local total output will therefore become 12,000 tons annually of plywood and hardboard. The need of the country is estimated at about 15,000 tons annually. It has, therefore, been found advisable to expand existing factories or set up a new factory for the production of 5000 tons annually of plywood to meet local consumption.

Productive Capacity.

Estimated at about 3000 tons annually, i.e. about 5000 cubic metres annually working 3 shifts.

4. Production of Packing Cases

Purpose of Project.

It is expected to be able to export large quantities of fruit and vegetables owing to increasing foreign demand and expansion in growing same. It will naturally be necessary to pack these in cases made of wood or carton. The number of cases required has been estimated at about 1,500,000 cases annually.

As the production of these case in such large quantity requires a special factory to work on sound technical lines with a view to reducing production costs to the least possible minimum, and considering that the local production now of such cases is being effected in parts imported from aborad, it has been proposed to set up an independent factory for the production of these cases locally instead of importing them from abroad as is done in most cases now.

It is proposed to set up the factory in the vicinity of fruit and vegetable packing stations.

Productive Capacity.

Estimated at about 1,500,000 cases annually, in one shift.

## 6. METAL INDUSTRIES

## 6- METAL INDUSTRIES

### I. Iron and Steel Industries

1) Completion of the Small sections Mill of the Egyptian Iron and Steel Co.
2) Increasing the Production of the Mill at the Delta Steel Mill Co.
3) " " " of the Rolling Mill Section at the Egyptian Copper Works.
4) Increasing the Producion of the Rolling Mill Section at the National Metal Industries Co.
5) Expansion in Mell Cable Cast Iron.
6) Steel Forgings
7) Wire Ropes.
8) Cast Iron & Steel Rolls.
9) Semi-Continuous Strip Mill.
10) Production of Pig Iron.
11) " of Steel Ingots.
12) Completion of the Equipment of the Egyptian Iron and Steel Co.

### II. Non-Ferrous Metal Industries

1) The Industry of Copper, Super Phosphate, and Zinc Oxide.
2) Electolitic-Zinc Industry.
3) Electro-Aluminium Industry.
4)

### III. Production Equipment & Machinery

1) The Production of Air Compressers.
2) Manufacture of Steam Boilers.
3) Looms for the Textile Industry.

## 1/ IRON AND STEEL INDUSTRIES

### 1. Completion of the Small Sections Mill of the Egyptian Iron and Steel Company

AIM :

This project aims at completing the Steel Mill unit which the gyptian Iron and Steel Company bought from the Delta Steel Mill. The production capacity of this unit is to reach 80 thousand tons yearly distributed in the following manner :

| | |
|---|---|
| 12,000 | ton of wire rods |
| 32,000 | ton bars for re-inforced concrete |
| 28,000 | ton small sections such as angles & flats |
| 8,000 | ton iron baling strips |

### 2. Increasing the Production of the Rolling Mill at the Delta Steel Mill Co.

AIM :

The aim of this project is to double the production of the Rolling ill Section of the Delta Steel Mill and to diversify the production with a iew to satisfying the requirements in iron for concrete construction and the ods needed for wires, and strips for furniture manufacture.

The production of this project is estimated at approximately 39 housand tons distributed in the following manner :

| | |
|---|---|
| 18,000 | ton Reinforced concrete bars |
| 14,000 | ton wire rods |
| 7,000 | ton Strips for furniture manufacture |

### 3. Increasing the Production of the Rolling Mill Section at the Egyptian Copper Works

AIM :

The aim of this project is to raise the production of the Steel olling Mill Section to produce thin iron bars used in re-inforced concrete.

The production capacity of this project is 9500 ton yearly of hin reinforced concrete bars, 5/16 & 1/4" size.

## 4. Increasing the Production of the Rolling Mill Section at the National Metal Industries Co.

AIM :

This project aims at changing the method of drive in use at present in the Rolling Mill section from the use of steam engine to the use of electric power.

This change will result in the increase of production by approximately 10 thousand ton yearly of iron rods to be used in reinforced concrete.

## 5. Expansion in Melleable Cast Iron.

AIM :

The additional production capacity for these goods is approximately 2800 ton yearly distributed as follows :

1800 ton pipe fittings

1000 ton for agricultural machines & spinning & Weaving machine parts.

To obtain the above increase it is necessary to expand the Factory which has been contracted for.

## 6. Steel Forgings

AIM :

The increased production capacity required for these articles is approximately 4500 ton yearly by power press.

It is possible to obtain this increase by expanding the factory which has been contracted for within the programme of the First Five Year Plan by an additional capacity to produce 4500 ton. The production would then have a capacity of 9000 ton yearly.

## 7. Wire Ropes.

A I M :

The requirements for wire rope amount to approximately 1325 ton yearly based on the 1958 consumption. As there are no local factories for the production of this article it is considered necessary to establish a factory to produce wire rope with a production capacity of 1500 tons yearly.

## 8. Cast Iron & Steel Rolls

A I M :

The production of cast iron and steel rolls is considered a necessary and complimentary requirement to the production of iron, steel, copper and aluminium sheets and sections. The consumption of these factories plus that of the paper, and plastic factories is an acceptable sized production to be undertaken locally. Therefore, this project has been included in the programme of the Second Five Year Plan for iron and steel. It is suggested to make this project a part of the factories which specialise in casting steel and cast iron.

The local consumption capacity for rolls of various sizes measured by their total weight is 3,000 ton yearly. This consumption is the basis of study for this project.

## 9. Semi-Continuous Strip Mill.

### AIM :

This project is included amongst those for which an agreement with the U S S R has been made for technical and economic cooperation. The Egyptian Iron & Steel Company will erect this mill in their Factory.

The preliminary studies for this project were made on the basis of the production of 1,000 millimetres wide sheets because this is the width mostly required in industry and because it would not be possible to export smaller sizes, as may be considered for any excess production beyond local needs; and because it would still be necessary to import sheets of this size if it were decided to produce sheets of a smaller size.

It is proposed that the unit produced be of the semi-continuous type of high quality such as advised by the U S S R experts. The minimum economic size of the unit produces 300 thousand ton yearly of sheets and strips, if three shifts of work are used.

It is possible for the production to be increased finally to one million ton if certain equipment is increased even though the local consumption capacity is 120 thousand ton yearly. The study is, therefore, limited to the basic equipment required to produce 300 thousand tons yearly. A future revision can increase the equipment and raise the production above this level when export is considered or local consumption expands.

It should be noted that because it is possible to work this unit before completing the projects for the production of pig iron and steel ingots to be mentioned later; and because steel ingots of the size required are insufficiently available at present for the supply of this unit when it starts production, therefore, the study was made on the assumption that the steel ingots would be imported. It is clear that in the case where they are produced locally the economic value of the project increases noticeably and the saving in foreign currency is great. For this reason it is necessary to start the two projects together : the production of steel ingots and the semi-continuous strip mill.

The study shows that the project brings in little profit, estimated at approximately L.E. 70,000 in the case where the needs of local consumption which amount to 120 thousand ton yearly, are to be satisfied. A greater profit is made if the production is increased.

It is suggested that the unit should work two shifts at least in order to produce 210,000 ton and that the excess production beyond local needs, should be exported at world market price. In this case it would be necessary to institute an export allowance in order to make prices competitive with those of the world market. The needed fund can be obtained by raising the price paid by local consumers by L.E. 5 per ton.

When steel ingots are produced locally their price will compete with world market prices without need for an export allowance.

## 10. Production of Pig Iron
## &
## 11. Production of Steel Ingots.

AIM :

The expansion of present production in iron and steel factories.

These two projects are closely related. Study has shown that the production of pig iron from which iron and steel are produced is insufficient to cover the needs of the projects included in the programme of the First Five Year Plan and also those proposed for inclusion in the Second Five Year Plan as well as the annual local consumption.

PIG IRON:

The total requirements for major iron products is approximately 570 thousand tons. The scrap iron, five years from now, will be 80 thousand tons. Thus the requirements in pig iron (for the production of the above mentioned iron products) will be 650 thousand tons yearly. As the two blast furnaces of the Iron & Steel Company produce 300 thousand tons yearly, and through the ferro-manganese project and the illmanite project approximately 40 thousand tons yearly, will be produced, it will be necessary to increase the production by 310 thousand tons to satisfy consumption needs. This is besides the needs of the foundaries which is approximately 60 thousand tons yearly of pig iron and 3 thousand tons yearly of Malleable Cast Iron. Therefore, the total extra needs in pig iron is 373 thousand tons yearly. It is suggested to erect a project to produce pig iron and a unit to transform the pig iron into steel ingots in order to satisfy these needs.

The nature of the ore in the Western Desert is not so far clearly defined with respect to quantity and quality, and the final studies on these mines will not be available for another year.

The Aswan mine will attain 550 thousand tons iron ore yearly, this is only enough to supply the needs of the two blast furnaces which exist at present. And as only in the third programme the exploiting of the iron ore

10 & 11. Production of Pigiron & Production of Iron & Steel - Cont.

existing in the Northern Oasis will be started, it is not, therefore, possible to extract the iron from the ore either by using the blast furnace or by any other possible method except after the studies on the nature of the ore have been completed.

It is necessary to relate the two projects (that of producing the pig iron and that of erecting the steel unit) because the equipment of the steel unit will depend on the nature of the ore and the method employed to work it. This situation applies also to the unit for preparing the iron ores.

The requirements have shown the need to produce 373 thousand tons pig iron yearly. It is, therefore, necessary to earmark LE. 12 million to erect a unit to produce the pig iron and another unit to produce the steel and its subsidiaries. It will be necessary to determine the method of production and the place where the mill be best erected. This will be done on the basis of the final results of the studies at present underway on the nature of the iron ore of the Western Desert, the iron reserve at Aswan, and the findings in the Northern Oasis.

The Ore necessary for the two projects.

The additional requirement of 373 thousand tons of pig iron, needs approximately 830 thousand tons ore yearly besides 550 thousand tons yearly needed to work the two existing blast furnaces of the Egyptian Iron & Steel Company.

As the Aswan mine yields 550 thousand ton of ore yearly, i.e. enough to work the two blast furnaces, the situation therefore requires :

1. To open a new mine in the Western Desert which would produce 830 thousand tons yearly of ore with a 43 % iron ore.
2. To complete the Mining surveying at Aswan to evaluate the reserves existing in the area and the economic possibility of exploiting it.
3. To make studies of the iron ore in the Northern Oasis to determine the economic possibility of their use.

It is proposed to expand the exploitation of the iron ore in order to bring the production capacity of pig iron to one million tons yearly. This is the lowest economic unit possible for the production of iron and steel.

## 12. Completion of the Equipment of the Egyptian Iron and Steel Company.

AIM :

This project aims at completing certain equipment of the Iron and Steel Company in order that balanced production may be attained in the presently existing units and in order that these same units may be worked to their utmost economic capacity. This will result in a 25 % increase in production as estimated when the second blast furnace is working, that is 220 thousand tons yearly of iron and steel products.

## II NON-FERROUS METAL INDUSTRIES

### 1. The Industry of Copper, Super Phosphate, and Zinc Oxide.

A I M :

The copper ore of the Om Samyouki mines consists of a high percentage super-phosphate and zinc oxide; and specially the zinc, which appears in the form of zinc sulphate. This allows for the production of sulphuric acid. There is also a greater percentage of gold and silver in this mine than exists in other ores.

From the abundant raw phosphates in the area it is possible to produce super-phosphate through the use of the sulphuric acid.

The estimated product of the proposed electrolitic-copper factory is 5,000 tons yearly. This quantity will help in satisfying the local needs which are estimated for the year 1965 as between 9 and 10 thousand tons. This factory will also produce yearly 150 thousand tons superphosphate required locally. The zinc produced will, in part, raise the production level of the electrolitic-zinc factory and in part be sold, after satisfying the local requirement, abroad at world market price.

This Factory will have a residue of precious metal (gold and silver) estimated at L.E. 350,000 yearly.

It is possible to expect an increase in production capacity when studies have been completed on the reserves available.

## 2. Electrolitic - Zinc Industry

A I M :

Zinc is the metal most abundantly to be found in Egyptian mines. It exists in the areas south of Kouseir and in other similar areas. The most important mine is that of Om Gheig. Mixed with the zinc is some lead ores.

An estimate of the reserves available in Om Gheig mine has been made from extensive study, and the production capacity which has been set at 10 thousand tons yearly, is proportionate to the reserves which is being estimated now.

In the Om Simyouki mines the zinc ore exists in high proportions mixed with copper in the form of zinc-sulphide. The preliminary studies on this mine show the existence of large reserves of zinc ore. It will be possible on the basis of figures obtained from the results of the surveys, to raise the estimated production rate of the zinc factory.

Zinc is a non-ferrous metal of stratigic importance in view of its extensive use in the production of brass ingots necessary for ammunition and also necessary to the galvanizing of iron products in order to protect them from rust, such as ordinary galvanized sheets, corrugated sheets, pipes and other.

White oxide of zinc is the most important basis for most oil paints. It is one of the additional products resulting from the production of zinc metal. There is a constant increase in the national needs for this metal resulting from the production of various kinds of ammunition into which brass enters on a large scale both for military and civil purposes. It is estimated that the consumption will range in 1964 between 5,000 and 6,000 tons.

The production capacity of the proposed factory is estimated at 10 thousand tons yearly. This is the economic unit upon which the industry can be established. As the consumption is estimated at 6 thousand tons, there will be an excess available for export estimated at 4 thousand tons yearly. It will be possible to sell the excess production of electrolitic zinc on foreign markets at world prices. World prices for this metal are greatly affected by supply and demand. The maximum price attained has been £180 per ton, the actual price i approximately £98 on the London Exchange.

## 3. Electro-Aluminium Industry.

AIM :

Bauxite or Alumina is the basis for this metal. Until now the presence of bauxite has not been proved even though surveys are underway to obtain aluminium from Egyptian Kaolin which exists in large quantities and in varying stages of purity.

The proposed electro-aluminium industry is based on the import of aluminium ore from abroad and the local extraction of the metal from the ore.

If aluminium can be obtained from the use of Egyptian Kaolin, then this should be used. The studies at present underway will reveal the possibility of this.

The present national requirements of aluminium is approximately 2550 tons, 2000 tons of this in form of sheets and discs, 500 tons of aluminium foil. It is expected that this figure will reach 3000 tons to which should be added another 3000 tons to be used in the production of high tension electric cables.

The possibility for export of this metal will depend on the price of the electric current. Therefore, it is proposed to erect the factory either in the Aswan area or in the area of the Kattar Depression. It is possible to enlarge the economic scope of this project and also to export its produce.

The production capacity of this project during the first stage, has been determined at 5 thousand tons yearly of aluminium ingots. This will satisfy the national needs. Expansion can be undertaken in accordance with the possibilities for export.

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## III) PRODUCTION EQUIPMENT & MACHINERY

### 1. The Production of Air Compressors.

AIM :

There is no doubt that compressed air is necessary to almost all industries. Some factories use it to work machinery and others use it for cleaning or other related purposes. Air compressors are also used for many other purposes such as cleaning and lubricating motorcars at service stations.

The present national needs are estimated at approximately LE.200 thousand. This is the cost of such units imported yearly. And in view of the expansion in industry resulting from the First and Second Five Year Plans, together with the expansion in existing industries, it is expected that an increase of approximately 50 % will be needed for industry alone. Therefore, it can be estimated that the national requirements in air compressors will be approximately LE. 300,000.

### 2. Manufacture of Steam Boilers

AIM :

The local market need for boilers is estimated at approximately 50 to 60 units annually of a capacity of 1 - 5 tons steam per hour, and 200 boilers of a capacity of ½ - 1 ton steam per hour. It is, therefore, proposed to erect a small local boiler industry.

Preliminary studies reveal that the Abou Zaabal boiler factory attached to the Railways Organization could undertake the execution of this project through the use of the equipment and machinery it possesses.

## 3. Looms for the Textile Industry.

AIM :

The 50,000 spinning machines contracted for under the First Five Year Plan will be increased to 100,000 under the Second Five Year Plan. The possibility of producing the looms has been studied. A census has been taken of the looms in use in the Egyptian Region and they have been found to number 30,000. If the depreciation is estimated at 10 % per annum, we find an annual requirement of 3,000 looms. This figure does not take into consideration any possible expansion in the weaving industry.

The production capacity of the suggested project is 6 machines daily, i.e. 1,800 machines yearly.

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# 7. TEXTILE INDUSTRIES

## 7- TEXTILE INDUSTRIES

### I. Cotton Textile Industries, Dyeing & Finishing

A) Medium Counts Cotton Spinning Projects

1, 2, 3, 4 - Four Units each 30.000 Spindles for Medium Counts' Cotton Spinning.

B) Cotton Textile Weaving Projects

5 & 6 - Two weaving Units, each of 864 Looms.

C) Projects for Cotton Textile Finishing

7 - Expansions in Shoubra El-Kheima and Mehalla El-Kobra Finishing Plant.

D) Fine Spinning Project

8 & 9 - Expansion of the Mahmoudich and Damietta Fine Spinning Mills.

### II. Wool and Fiber Industries

A) Wool Industry

1- The Production of Tops from Greasy & Scoured Wool.

B) The Spinning and Weaving of Wool

2- Increase Production of Worsted Spun Yarn by 30% of the Actual production of the Existing Mills.

3- Increase Production of Wooden Spun Yarn by 30% of the Actual production of the Existing Mills.

4- Increase Production of Worsted Cloth by 30% of the Actual production of the Existing Mills.

C) Fiber Industries

5 & 6 - Expansion of the Jute Factories at Shoubra & Bilbeis

7 - Expansion of Flax-Retting.

8 - Expansion in the Spinning, Weaving & Finishing of Linen Cloth

D) Artificial Fiber Industry

9 - Viscose Production by Continuous Process

10 - Production of Motorcar type Cloth.

11 - Cellophane Paper Unit.

12 - Expansion of Misr Nylon Factory.

13 & 14 - Dacron & Orlan Fiber Production.

## I. Cotton Textile Industries, Dyeing & Finishing

### A) Medium Counts' Cotton Spinning Projects.

### 1,2,3,4 - Four Units each 30 thousand Spindles for Medium Counts' Cotton Spinning.

**Aim :**

Export figures for the last five years show that the demand for medium count yarn has increased by 142%. The recent contracts show that this trend continues. If this percentage it taken as the rate of increase for the next five years, the figure at the end of this period will rise to approximately 10 thousand ton of spun yarn which needs 120 thousand spindles to produce it.

It is therefore suggested that the spinning industry should be expanded for medium spinning to 120 thousand spindles producing yarn with average count No. 30. It is suggested that this be achieved by erecting four spinning units, each of which for 30 thousand spindles and would produce together 10 thousand tons of yarn yearly.

### B) Cotton Textile Weaving Projects.

### 5 & 6 - Two Weaving units, each of 864 looms :

**Aim :**

The demand for grey cloth made of medium yarn increases year after year. It was therefore decided that half of the amount of medium yarn which it is proposed to produce should be woven and exported as grey cloth.

For this it is necessary to establish two weaving units, each having 864 looms to produce 2500 tons of cloth.

### C) Projects for Cotton Textile Finishing

### 7- Expansions in Shubra El Kheima and Mehalla el Kobra finishing plants :

**Aim :**

Large factories have the advantage of being equipped with chemical departments where the material produced can be finished and prepared for dyeing. These factories can expand their dyeing, printing and bleaching operations space with their expansion in weaving.

Small factories however have no possibility of finishing the material they produce, and therefore revert to other factories for this. For this reason the First Five Year Plan included two units for finishing, one erected at Shoubra el Kheima and the other at Mehalla el Kobra. Each of these have a production capacity of 15 million meters of cloth per year.

From surveys made upon the production of small and medium weaving factories it is found that they produced 192 million metres in 1957, 196 million metres in 1958. In order to meet this increase in the production of cloth by small and medium factories and to afford them possibilities of finishing, it is proposed under the Second Five Year Plan to increase the production capacity of the two units (Shoubra el Kheima and Mehalla el Kobra) by 10 million metres each in order that each may produce 25 million metres yearly instead of 15 million.

This can be done by increasing the productivity of the bleaching section by 3 million metres, that of the dyeing section by 2 million metres, and that of the printing section by 5 million metres; and by adding to each of the two units a section for the dyeing of yarn on hanks or reels or beams with a production capacity of 1/2 ton daily.

D) Fine Spinning Projects :

8 & 9 - Expansion of the Mahmoudieh and Damietta Fine Spinning Mills

Aim :

The response of the foreign markets to Egyptian fine spun yarn depends on several factors. Some of these are the yearly increase in world consumption and the possibility for the Egyptian goods to gain these markets thorough modern methods of sale such as market research, and by the good quality of the products.

It was decided that the Second Five Year Plan should include no new factory for fine spinning until suitable markets abroad are found for the present products, and until our production reaches a high quality standard and with competitive prices.

But it is suggested that to improve the economic value of the Damietta and Mahmoudieh Mills which were erected as part of the First Five Year Plan, they should be expanded so that each attains a production capacity of 30 thousand spindles; this expansion will lead to the production of 600 ton of fine spinning yarn averaging No. 80 yearly.

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## II. Wool and Fiber Industries

### A) Wool Industry :

### 1. The Production of Tops from Greasy and Scoured Wool.

**Aim :**

In the Egyptian Region the wool industry for woven material and for hand and machine knitting is based on imported wool in the form of tops. The annual amount imported is 3200 ton costing £ 4,500,000. It is expected that in the next few years this amount will increase to meet the expected expansion in the local industry resulting from local consumption needs to about 4,500 tons costing about £ 5,850,000.

It is possible to produce the tops locally by importing the raw wool and processing it. It is also possible to mix the imported raw wool with the local wool, when the sheep raising which is at present underway at Ras el Hekm, has been expanded.

The Second Five Year Plan suggests the erection of a plant to produce tops at the rate of 3,6000 tons yearly. If this industry is successful it will be possible to expand and/satisfy completely the national requirements in wool. The aim in establishing this plant is to encourage the use of local wool, to create markets for the goods, and to encourage attention to the breeding of sheep and the same time, to save the hard currency which was previously used to buy the tops.

It is possible to being this project in the following manner :

1. Establish a plant to scour wool at the rate of 1,200 tons yearly.
2. Establish an industry to produce tops at the rate of 3,000 tons yearly from wool scoured both locally and abroad. This production can be in time raised to 4,500 tons.
3. Establish a plant to dye the tops as no such plant exists at present. Its production rate will be 1,500 tons yearly.

### B) The Spinning and Weaving of Wool

2. Increase Production of Worsted Spun Yarn by 30% of the Actual Production of the Existing Mills.

For This it is required to add 13500 spindles with the necessary preperation to the existing Mills.

3. Increase Production of Woolen Spun Yarn by 30% of the Actual Production of the Existing Mills.

For this it is required to add 4800 Spindles with the necessary preparation to the existing Mills.

4. Increase Production of Worsted Cloth to 30% of the Actual Production of the Existing Mills.

For this it is required to add 330 looms with the necessary preparation to the existing Mills.

The expension in Wool textile industry will be accompanied by wool finishing & dyeing processes.

## Fiber Industries.

### 5 & 6 - Expansion of the Jute Factories at Shoubra & Bilbais.

**Aim :**

The total national requirements for all kinds of sacks is approximately 36,000 tons. It is expected that this requirement will increase with the increase of agricultural land resulting from the High Dam and after the Kima factory starts production. The requirements of this factory alone is estimated at present to be 4,000 tons yearly,

The production capacity of the Shoubra factory is approximately 9,000 tons yearly after installation of the recently received equipment. It is proposed to increase this to 15,000 tons within the next five years.

The production capacity of the Bilbais factory which produces thick sacks is 18,000 tons yearly. It is proposed to increase this to 25,000 tons yearly for local consumption.

### 7. Expansion of Flax-retting.

**Aim :**

Jute growing did not succeed in Egypt as it is a substitute for cotton growing. Therefore it has been thought to try to grow Egyptian flax in the place of maize. The crop produced is larger than that of jute and the land required is estimated at 30 -35 thousand feddans.

Expansion in the growing of flax requires the existance of machines for peeling and of diesel engines to drive such machines, and also tanks and beds, and corresponding pumps, Prime movers, pipes and means of transport both by road and river.

The production capacity of this project is estimated at 16,000 tons of linen yearly to replace a similar quantity of jute which is actually imported yearly in the form of raw material.

### 8. Expansion in the Spinning, weaving & Finishing of Linen Cloth.

Aim :

Flax follows cotton in the order of importance amongst the vegetable raw materials used in the Textile manufacture. The production capacity of the flax spinning mills of the Southern Region is 2,500 tons of yarn yearly, besides 2,000 tons is exported yearly. As the various stages of flax spinning and weaving require a large amount of labour, and as the whole of the crop produced is used by the local industry and by export, and as the its waste is entirely used in the manufacture of all kinds of string, and article board and the seed are used to produce oil for local consumption; it is proposed to stabilize the existing production of flax by increasing its production capacity by adding new units of production and renewing the existing equipment by 750 tons of linen yarn and 4.5 million metres of linnen & mixed textiles yearly. This increase will require addition 3600 wet spindles, 400 dry spindles with the necessary preparation 160 looms and a printing unit.

## D) Artificial Fiber Industry

### 9. Viscose Production by Continuous Process.

Aim :

Viscose is used in the production of filaments and stable fibers and sellophane paper and tyre cords.

It is proposed to erect a new unit to produce viscose by the continuous proces for the following reasons :-

1. to provide a sufficient reserve for the existing viscose machinery and to ensure the production of filaments at its present level without interruption. This is estimated at 2,5 ton daily.
2. to feed the Misrophane machines to complete the production capacity required during the next five years. This is estimated at 2.5 ton.
3. to feed the fiber producing machines and to use the presently existing production capacity. This is estimated at approximately 6 ton.
4. to ffed the machines of the tyre cord project. This is estimated at approximately 4,5 tons. i.e. the production capacity estimated for the project is 15,5 tons yearly.

### 10. Production of Motorcar Tyre cloth

**Aim :**

The actual national consumption of artificial silk filaments needed to produce motorcar tyre cloth is 1200 tons yearly, The whole of this is imported. The Consumption is expected to increase over the coming few years to 1650 tons yearly. The policy of self sufficiency dictates the erection of a project to produce the required amount.

### 11. Cellophane Paper Unit.

**Aim :**

The local consumption in cellophane is 600 tons yearly. This is increasing steadily with the mounting variety of purposed for which it is used in commercial wrapping.

The actual production is sufficient to meet the needs of the present consumption. But in view of the expected increase in this it is proposed to double the production.

12. Expansion of Misr Nylon Factory.

Aim :

The Southern Region of the U.A.R. consumes at present approximately 120 tons nylon products yearly. The Northern Region uses approximately 360 tons yearly. The present production attains 72 tons yearly. There are plane to expand this by another 108 tons. Demand is increasing rapidly through increasing consumption. It is proposed to expand the production capacity of the existing factory by approximately 140 tons yearly.

13 & 14 - Dacron and Orlan Fiber Production.

Aim :

Dacron fiber and its substitute the Tyreline & Targal men's summer suiting and for uncruchable and Non-ironable women's clothing. Orlon has successfully replaced fine wool in women's knitted clothing. Foreign statistics show an increase in the production of these fibers at the rate of 400 % yearly. It is proposed that in view of this trend, a factory for Dacron production and another for Orlon should be erected. Each of the two units would produce approximately one ton daily.

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## 9. VOCATIONAL & TRAININING CENTRES

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## 9- MANPOWER & VOCATIONAL TRAINING.

### I- Vocational Training Centres.

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|---|---|
| 12 | metal trades centres to train 3600 skilled workders yearly. |
| 3 | electric trades centres to train 900 skilled workers yearly. |
| 2 | chemical trades centres to train 600 skilled workers yearly. |
| 1 | precision instruments centre to train 300 skilled workers yearly. |

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### II- Training Centre for Instructors.

To train 90 instructors yearly.

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